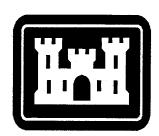
FLOOD CONTROL
RED RIVER OF THE NORTH AND RED LAKE RIVER
EAST GRAND FORKS, MINNESOTA

SPECIFICATIONS FOR

PHASE 2 LEVEES

July 2002



US Army Corps of Engineers

St. Paul District

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SOLICITATION, OFFER,		. SOLICITATION NO.	2. TYPE OF SOLICITATION		3. DATE ISSUED	PAGE OF PAGES
AND AWARD		DACW37-02-B-0002 X S		D BID (IFB)	17-Jul-2002	
(Construction, Alteration, or	Repair)		│	ΓΙΑΤΕD <i>(RFP)</i>		1 OF 158
IMPORTANT - The "offer" se	ection on th	ne reverse must be fully	completed by offe	ror.		
4. CONTRACT NO.		5. REQUISITION/PU	JRCHASE REQUES	ST NO.	6. PROJECT NO.	
		W81G67-2023-2032				
7. ISSUED BY	COE	DE DACW37	8. ADDRESS OFF	ER TO (If Othe	r Than Item 7)	CODE
CONTRACTING DIVISION USACE - ST PAUL 190 5TH STREET E ST PAUL MN 55101-1638			See Item 7			
TEL:	FAX: 65	51-290-5706	TEL:		FAX:	
9. FOR INFORMATION	A. NAME			B. TELEPHONE	NO. (Include area code)	(NO COLLECT CALLS)
CALL:	TAMMY M	MOORE		651-290-5408		
			SOLICITATIO	N		
NOTE: In sealed bid solic	itations "o	offer" and "offeror" me	ean "bid" and "bi	dder".		
10. THE GOVERNMENT REG	QUIRES PE	RFORMANCE OF THE W	VORK DESCRIBED	IN THESE DOCU	MENTS (Title, identifyin	g no., date):
EAST GRAND FORKS PHASE 2 LEVEE, EAST GRAND FORKS, MINNESOTA. Work is divided into three reaches. Principle features of work include all plant, labor, materials and supplies required for construction of approximately 25,000 linear feet of earth levees, 650 linear feet of floodwalls, 2 pump stations, 4 closure structures, 1 restroom facility, parking lot, 5,000 linear feet of recreation trail, 7,500 linear feet of storm sewer and associated items. This procurement is issued unrestricted under the Small Business Demonstration Program (Public Law 100-656). The North American Industrial Classification System Code (NAICS) is 234990 with a Small Business Size Standard of \$27.5 million. The estimated order of magnitude of construction in terms of physical characteristics and estimated price range is more than \$10,000,000.						
11. The Contractor shall begin	•		lar days and comple		calendar days after r	eceiving
		·	<u> </u>		Section 00700	·)
12 A. THE CONTRACTOR MI (If "YES," indicate within how I X YES NO				PAYMENT BONDS	S? 12B. CALEND	AR DAYS
13. ADDITIONAL SOLICITATI	ION REQUIP	REMENTS:			•	
A. Sealed offers in original and 2 copies to perform the work required are due at the place specified in Item 8 by 14:00:00 (hour) local time 8/15/02 (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.						
B. An offer guarantee X is,	ш	required.				
C. All offers are subject to the	(1) work red	quirements, and (2) other	provisions and clau	ises incorporated in	n the solicitation in full tex	d or by reference.
D. Offers providing less than60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.						

			SOLICIT	ATION, OFFER (Construction		•	tinued)			
					(Must be ful		by offeror)			
14. NAME AND ADI	DRESS OF	OFFEROR	(Include ZIF		<u> </u>	•	nclude area c	ode)		
					16. REMITT	ANCE ADDR	ESS (Includ	e only if differen	than Item	14)
				See Item	14					
CODE		FACILITY C	ODE							
17. The offeror agre accepted by the Got the minimum required AMOUNTS SE	vernment in ements stat	n writing with	in BD. Failure to	calendar days aft	er the date of	ers are due.	(Insert a	nny number equa		
18. The offeror agre	es to furnis	h any require	ed performan	ce and payment b	onds.					
		(The of		9. ACKNOWLEDO				f each)		
AMENDMENT NO.										
DATE										
20A. NAME AND TI OFFER (Type or p		ERSON AUTI	HORIZED TO	SIGN	20B. SIGNA	20B. SIGNATURE 20C. OFFER DATE				R DATE
			AW	VARD (To be con	mpleted by G	overnment)				
SEE SCI		JLE								
22. AMOUNT		23. ACCO	Unting and) APPROPRIATIC	N DATA					
24. SUBMIT INVOIC	CES TO AD	DRESS SHO	OWN IN	ITEM	25. OTH	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO				
(4 copies unless otherwi	se specified)				10 L	J.S.C. 2304(c))	41 U.S.C. 2	253(c)	
26. ADMINISTERED) BY	COL	DE		27. PAY	27. PAYMENT WILL BE MADE BY CODE				
		CONT	RACTING OI	FFICER WILL CO	MPLETE ITEI	1 28 OR 29 A	S APPLICAB	LE		
28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.			Your offer summate your offer	29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.						
30A. NAME AND TI TO SIGN (Type or)		ONTRACTOR	R OR PERSO	N AUTHORIZED	31A. NA	ME OF CONT	TRACTING O	FFICER (Type	or print)	
30B. SIGNATURE			30C. DATE		31B. UN BY	31B. UNITED STATES OF AMERICA BY 31C. AWARD DA				VARD DATE

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SECTION (00010 Solicitation Contract	Form			
ITEM NO 0001	SUPPLIES/SERVICES BONDS (Bid, Performance Basic Bid Items Only	QUANTITY 1.00 e and Payment)	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0002	SUPPLIES/SERVICES Preconstruction Damage St Basic Bid Items Only	QUANTITY 1.00 urvey	UNIT Lump Sum	UNIT PRICE	AMOUNT
REACH 1 Portion from	m Station D129+ 00 to D179	9 +00 (Excludin	g BNSF/Hill Sti	reet Closure and BNS	SF Closure at
ITEM NO 0003	SUPPLIES/SERVICES Miscellaneous Demolition	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0004	SUPPLIES/SERVICES Water Treatment Plant Der	QUANTITY 1.00 nolition	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0005	SUPPLIES/SERVICES Overhead Electrical Transm	QUANTITY 1.00 nission System F	UNIT Lump Sum Removal	UNIT PRICE	AMOUNT
ITEM NO 0006	SUPPLIES/SERVICES Electrical Substation Remo	QUANTITY 1.00 oval	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0007	SUPPLIES/SERVICES Clearing and Grubbing	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0008	SUPPLIES/SERVICES Stripping	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT

ITEM NO 0009	SUPPLIES/SERVICES Excavation	QUANTITY 5.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0010	SUPPLIES/SERVICES Levee Removal	QUANTITY 48,800.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0011	SUPPLIES/SERVICES Inspection Trench	QUANTITY 2465.00	UNIT Linear Foot	UNIT PRICE	AMOUNT
ITEM NO 0012	SUPPLIES/SERVICES Inspection Trench at Remov	QUANTITY 6520.00 ved Building Site	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0013	SUPPLIES/SERVICES Random Fill			·	<u> </u>
ITEM NO 0013AA	SUPPLIES/SERVICES FIRST 7,400 CUBIC YAR	QUANTITY 7,400.00 .DS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0013AB	SUPPLIES/SERVICES OVER 7,400 CUBIC YARI	QUANTITY 1,300.00 DS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0014	SUPPLIES/SERVICES Impervious Fill			·	

ITEM NO 0014AA	SUPPLIES/SERVICES FIRST 81,700 CUBIC YA	QUANTITY 81,700.00 RDS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0014AB	SUPPLIES/SERVICES OVER 81,700 CUBIC YA	QUANTITY 14,400.00 RDS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0015	SUPPLIES/SERVICES Select Impervious Fill				
ITEM NO 0015AA	SUPPLIES/SERVICES FIRST 12,000 CUBIC YA	QUANTITY 12,000.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
	11K31 12,000 COBIC 1A.	KD3		·	·
ITEM NO 0015AB	SUPPLIES/SERVICES	QUANTITY 2,200.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
	OVER 12,000 CUBIC YA	ARDS	Turu		
ITEM NO 0016	SUPPLIES/SERVICES Geotechnical Monitoring S	QUANTITY 1.00 system	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0017	SUPPLIES/SERVICES Water Treatment Plant Floor	QUANTITY 174.00	UNIT Linear Foot	UNIT PRICE	AMOUNT
ITEM NO 0018	SUPPLIES/SERVICES 2nd Ave. NE Stoplog Close	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT

ITEM NO 0019	SUPPLIES/SERVICES	QUANTITY 150.00	UNIT Linear Foot	UNIT PRICE	AMOUNT
	Jacked Interior Drainage –				
ITEM NO 0020	SUPPLIES/SERVICES Trenched Interior Drainage	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0021	SUPPLIES/SERVICES K14 Junction Manhole	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0022	SUPPLIES/SERVICES K14 Impact Basin	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0023	SUPPLIES/SERVICES 2nd Street NE Street Replace	QUANTITY 1.00 cement	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0024	SUPPLIES/SERVICES 2nd St. NE Road Relocatio Central Ave.	QUANTITY 1.00 n at 1st St. and	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0025	SUPPLIES/SERVICES Hill Street Road Raise	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0026	SUPPLIES/SERVICES 2nd Ave. Road Raise	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0027	SUPPLIES/SERVICES Bituminous Trial	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT

ITEM NO 0028	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0029	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00 2	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0030	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT .
ITEM NO 0031	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00 4	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0032	SUPPLIES/SERVICES Topsoil and Sod	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0033	SUPPLIES/SERVICES Trees and Shrubs	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
Reach 1, K1 ITEM NO 0034	4 Pump Station SUPPLIES/SERVICES Pump Station Structure	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0035	SUPPLIES/SERVICES Electrical	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0036	SUPPLIES/SERVICES Install Engine Generator Se	QUANTITY 1.00 t	UNIT Lump Sum	UNIT PRICE	AMOUNT

ITEM NO 0037	SUPPLIES/SERVICES Furnish and Install Load Ba	QUANTITY 1.00 ank	UNIT Each	UNIT PRICE	AMOUNT
ITEM NO 0038	SUPPLIES/SERVICES Mechanical	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0039	SUPPLIES/SERVICES Electrical Service	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0040	SUPPLIES/SERVICES Pump Station Sluice Gates	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT .
Reach 1, K1 ITEM NO 0041	4 Gate Well SUPPLIES/SERVICES Gatewell Structure	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT .
ITEM NO 0042	SUPPLIES/SERVICES Gatewell Sluice Gates	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT .
Reach 1, Gr ITEM NO 0043	riggs Park Recreation Area SUPPLIES/SERVICES Site Lighting	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0044	SUPPLIES/SERVICES Recreational Facility	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0045	SUPPLIES/SERVICES Site Furnishings	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT

ITEM NO 0046	SUPPLIES/SERVICES Parking Lot	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0047	SUPPLIES/SERVICES Concrete Walks/Paving	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0048	SUPPLIES/SERVICES Topsoil and Seeding	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0049	SUPPLIES/SERVICES Topsoil and Sod	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0050	SUPPLIES/SERVICES Trees and Shrubs	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT .
Reach 2 – E ITEM NO 0051	Entire Reach from Station F SUPPLIES/SERVICES Miscellaneous Demolition	T 101 + 00 to F 1 QUANTITY 1.00	21+ 00 UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0052	SUPPLIES/SERVICES Cleaning and Grubbing	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0053	SUPPLIES/SERVICES Stripping	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0054	SUPPLIES/SERVICES Inspection Trench	QUANTITY 1,860.00	UNIT Linear Foot	UNIT PRICE	AMOUNT

ITEM NO 0055	SUPPLIES/SERVICES Inspection Trench at Remo	QUANTITY 950.00 ved Building Site	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0056	SUPPLIES/SERVICES Impervious Fill				
ITEM NO 0056AA	SUPPLIES/SERVICES FIRST 2,750 CUBIC YAR	QUANTITY 2,750.00 DS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0056AB	SUPPLIES/SERVICES OVER 2,750 CUBIC YAR	QUANTITY 500.00 DS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0057	SUPPLIES/SERVICES Select Impervious Fill			<u> </u>	<u> </u>
ITEM NO 0057AA	SUPPLIES/SERVICES FIRST 1,000 CUBIC YAR	QUANTITY 1,000.00 DS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0057AB	SUPPLIES/SERVICES	QUANTITY 200.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
	OVER 1,000 CUBIC YAR	DS		·	·
ITEM NO 0058	SUPPLIES/SERVICES	QUANTITY 1,712.00	UNIT Linear Foot	UNIT PRICE	AMOUNT
	James Avenue Floodwall		-	·	·

ITEM NO 0059	SUPPLIES/SERVICES Trenched Interior Drainage	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0060	SUPPLIES/SERVICES James Avenue Street Replace	QUANTITY 1.00 cement	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0061	SUPPLIES/SERVICES Bituminous Trail	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0062	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0063	SUPPLIES/SERVICES DELETED	QUANTITY	UNIT	UNIT PRICE	AMOUNT
ITEM NO 0064	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0065	SUPPLIES/SERVICES Topsoil and Sod	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0066	SUPPLIES/SERVICES Trees and Shrubs	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
		BASIC ITE	M TOTAL (CLI	NS 0001 – 0066) \$	

OPTIONAL BID ITEMS

OPTION 1: Reach 1- Portion from Station D179 + 00 to E 54 + 23

ITEM NO 0067	SUPPLIES/SERVICES Miscellaneous Demolition	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0068	SUPPLIES/SERVICES Clearing and Grubbing	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0069	SUPPLIES/SERVICES Stripping	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0070	SUPPLIES/SERVICES Excavation	QUANTITY 9,320.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0071	SUPPLIES/SERVICES Inspection Trench	QUANTITY 14,620.00	UNIT Linear Foot	UNIT PRICE	AMOUNT
ITEM NO 0072	SUPPLIES/SERVICES Inspection Trench at Remove	QUANTITY 4,250.00 ved Building Site	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0073	SUPPLIES/SERVICES Random Fill SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0073AA	FIRST 7,400 CY	7,400.00	Cubic Yard		

ITEM NO 0073AB	SUPPLIES/SERVICES OVER 7,400 CY	QUANTITY 1,300.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0074	SUPPLIES/SERVICES Impervious Fill				
ITEM NO 0074AA	SUPPLIES/SERVICES FIRST 165,600 CUBIC YA	QUANTITY 165,600.00 ARDS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0074AB	SUPPLIES/SERVICES OVER 165,600 CUBIC YA	QUANTITY 29,200.00 ARDS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0075	SUPPLIES/SERVICES Select Impervious Fill				
ITEM NO 0075AA	SUPPLIES/SERVICES FIRST 40,400 CUBIC YA	QUANTITY 40,400.00 RDS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0075AB	SUPPLIES/SERVICES OVER 40,400 CUBIC YA	QUANTITY 7,100.00 RDS	UNIT Cubic Yard	UNIT PRICE	AMOUNT
ITEM NO 0076	SUPPLIES/SERVICES 2 nd Avenue NE Stoplog Cla	QUANTITY 1.00 osure	UNIT Lump Sum	UNIT PRICE	AMOUNT

ITEM NO 0077	SUPPLIES/SERVICES	QUANTITY 150.00	UNIT Linear Foot	UNIT PRICE	AMOUNT
	Jacked Interior Drainage –	36"RCP	1000		
ITEM NO 0078	SUPPLIES/SERVICES Trenched Interior Drainage	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0079	SUPPLIES/SERVICES Private Farm Gravel Road	QUANTITY 1.00 Raise	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0080	SUPPLIES/SERVICES US Highway 2 Private Acc	QUANTITY 1.00 eess Gravel Road	UNIT Lump Sum Raise	UNIT PRICE	AMOUNT
ITEM NO 0081	SUPPLIES/SERVICES Business Highway 2 Road	QUANTITY 1.00 Raise	UNIT Lump Sum	UNIT PRICE	AMOUNT .
ITEM NO 0082	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT .
ITEM NO 0083	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
ITEM NO 0084	SUPPLIES/SERVICES Topsoil and Seeding, Class	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE	AMOUNT
	OP	TION ITEM TO	TAL (CLINS 00	067 – 0084) \$	

TOTAL FOR ALL BASIC AND OPTION ITEMS (CLINS 0001 – 0084) \$_____

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ITEM NO 0085	SUPPLIES/SERVICES BNSF/Hill Street Stoplog C	QUANTITY 1.00 Closure	UNIT Lump Sum	UNIT PRICE N/A	AMOUNT N/A
ITEM NO 0086	SUPPLIES/SERVICES BNSF at Business Hwy 2 St	QUANTITY 1.00 toplog Closure	UNIT Lump Sum	UNIT PRICE N/A	AMOUNT N/A
OPTION 3:	Reach 3 – Entire Reach				
ITEM NO 0087	SUPPLIES/SERVICES Miscellaneous Demolition	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE N/A	AMOUNT N/A
ITEM NO 0088	SUPPLIES/SERVICES Levee Removal	QUANTITY 300	UNIT Cubic Yards	UNIT PRICE N/A	AMOUNT N/A
ITEM NO 0089	SUPPLIES/SERVICES Stripping	QUANTITY 1.00	UNIT Lump Sum	UNIT PRICE N/A	AMOUNT N/A
ITEM NO 0090	SUPPLIES/SERVICES Inspection Trench	QUANTITY 120	UNIT Linear Foot	UNIT PRICE N/A	AMOUNT N/A
ITEM NO 0091	SUPPLIES/SERVICES Impervious Fill			N/A	N/A
ITEM NO 0091AA	SUPPLIES/SERVICES	QUANTITY 2,300.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
	FIRST 2,300 CUBIC YARI	DS		N/A	N/A

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					_
ITEM NO 0091AB	SUPPLIES/SERVICES	QUANTITY 400.00	UNIT Cubic Yard	UNIT PRICE	AMOUNT
	OVER 2,300 CUBIC YAR	RDS	1 alu	N/A	N/A
ITEM NO 0092	SUPPLIES/SERVICES				
	Select Impervious Fill			N/A	N/A
ITEM NO 0092AA	SUPPLIES/SERVICES	QUANTITY 450.00	UNIT Cubic	UNIT PRICE	AMOUNT
	Yard FIRST 450 CUBIC YARDS			N/A	N/A
ITEM NO 0092AB	SUPPLIES/SERVICES	QUANTITY 80.00	UNIT Cubic	UNIT PRICE	AMOUNT
	OVER 450 CUBIC YARDS		Yard	N/A	N/A
ITEM NO 0093	SUPPLIES/SERVICES	QUANTITY 1	UNIT Lump Sum	UNIT PRICE	AMOUNT
	BNSF/Red River West Sto	NSF/Red River West Stoplog Closure Structure			N/A
ITEM NO 0094	SUPPLIES/SERVICES	QUANTITY 1	UNIT Lump Sum	UNIT PRICE	AMOUNT
	Topsoil and Seeding, Class	s 2		N/A	N/A

BID SCHEDULE NOTES

- 1. EFFECTIVE MAY 31, 1998, ALL CONTRACTORS MUST REGISTER WITH THE DEFENSE CENTRAL CONTRACTOR REGISTRATION (CCR) IN ORDER TO RECEIVE ANY CONTRACT AWARD. (other than those made via the Government credit card program). Contractors may register on line at http://www.ccr.gov. See Clause 252.204-7004 in Section 00100.
- 2. FACSIMILE OF BIDS/PROPOSALS AND FACSIMILE OF MODIFICATIONS THERETO, WILL NOT BE ACCEPTED.
- 3. All Quantities are estimated except where unit is given as "EA" (EACH) or "LS" (LUMP SUM).
- 4. NOTICE TO LARGE BUSINESS: The U.S. Army Corps of Engineers, St. Paul District, is committed to participation of Small Business, Small Disadvantaged Business and Women-Owned Small Business in the performance of work under this solicitation and resultant contract.

Your attention is directed to the solicitation clauses 52.219-0008 entitled "Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns", 52.219-0009 I entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan," and 52.219-7003 entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts)".

If you are a large business and the apparent low bidder with a bid exceeding \$1,000,000, submission of a Subcontracting Plan in accordance with above clauses will be required. The Contracting Officer will review the plan using the following goals to assure that it represents your best efforts to maximize subcontracting opportunities. Award will not be made until the Contracting Officer approves the Subcontracting Plan.

The following subcontracting goals are informational only and not legally binding but are considered reasonable and achievable during the resultant contract from this solicitation. The goals expressed in percent of total planned subcontracting dollars are:

Small	61.4%
Small Disadvantaged Business	9.1%
Women-Owned Small Business	5.0%
HUBZone Small Business	Maximum (%)Practicable
Veteran-owned Small Business	3.0%
Subcontract Reporting (SF 294 &	SF 295) 100.0%

- 5. The apparent low bidder will be requested to provide the following information as soon as possible after bid opening:
 - a. A Financial Statement, to include a balance sheet and income statement, and
 - b. A Bank Certification of Financial Capability (line of credit).

This information will be treated as confidential. The financial statements should be not over 60 days old. If over 60 days old, a certification should be attached stating that the financial condition of the firm is substantially the same or, if not the same, the changes that have taken place.

6. All extensions of the unit prices shown will be subject to verification by the Government. In case of a discrepancy between the unit price and the extension, the unit price will govern.

- 7. The original bid/proposal and any modifications must be complete as to all the items on the schedule. Award will be made to that bidder whose bid is most advantageous to the Government, based on price and the price related factors included in the solicitation.
- 8. Unbalanced Bids. The government may reject as nonresponsive any bid that is materially unbalanced between contract line item numbers or sub-items on the bidding schedule. A bid is materially unbalanced when it is based on prices that are significantly less than cost for some work and prices that are overstated, in relation to cost, for other work. A materially unbalanced bid may be rejected if the Contracting Officer has a reasonable doubt as to whether the bid will result in the lowest overall cost to the government even though it may be the low evaluated bid. Additionally, a bid that is so unbalanced so as to be tantamount to an advance payment will be rejected as nonresponsive even if acceptance of the bid would result in the lowest overall cost to the government.
- 9. Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing in accordance with Section 00100, Contract Clause "Explanation To Prospective Bidders", not later than 10 days prior to bid opening. Questions can be faxed to the contract specialist at (651) 290-5706. Questions received after the deadline may not be answered prior to bid submittal.
- 10. Funding for this contract is contingent upon the conditions stated in Section 00800, Clause No. 52.232-5001, Continuing Contracts.
- 11. The addresses, phone numbers, and Internet address (if available) for references cited in these specifications are listed in the Corps of Engineer Guide Specification (CEGS) 01090 SOURCES FOR REFERENCE PUBLICATIONS. CEGS 01090 is available on the TECHNIFO page of the Corps of Engineers Huntsville District Internet site at: http://w2.hnd.usace.army.mil/.
- 12. Any forthcoming amendments will only be available on this web site. E-mail notifications will be sent upon issuance of any amendments to all registered firms. E-mail message notifications may not be reliable based on system constraints. It is therefore recommended that each registered firm check this web site periodically for updates. A paper hard copy of each amendment will not be mailed unless specifically requested in writing.

13. Bid Bonds

- a. It is the responsibility of the bidder to include an acceptable bid guarantee with its bid. This bid note does not provide bidders with an all-inclusive checklist for submitting an acceptable bid bond rather, it provides some "lessons learned" information as to the unacceptability of photocopied bid bonds.
- b. This solicitation requires bidders to submit a bid guarantee along with their bids (see clause 52.228-1). One acceptable form of bid guarantee is a bid bond. For a bid to be responsive, the bid bond accompanying the bid must unequivocally bind the bonding company if it does not, the bid <u>must</u> be rejected as nonresponsive. Please note that a nonresponsive bid may not be corrected after bid opening to make it responsive it <u>must</u> be rejected. The Contracting Officer has the authority and responsibility to determine whether the bid bond and its accompanying documentation clearly show that the person(s) executing the bid bond on behalf of the surety have the authority to unequivocally bind the bonding company. In order for a bid bond to be acceptable, it must be accompanied by a valid power-of-attorney issued by the surety (the bonding company, not the insurance agency writing the bond).
- c. Photocopied or faxed powers-of-attorney are not acceptable. In order for a power-of-attorney accompanying a bid bond to be acceptable, it must be: (i) an original power-of-attorney (containing original signatures and corporate seals), (ii) a copy of a power-of-attorney accompanied by an original certification (original means original signature and original corporate seal) by the secretary (or other authorized officer) of the surety stating that the copied power-of-attorney is still in full force and effect as of the date of the certification and has not been revoked, or (iii) a power-of-attorney with facsimile (stamped, printed or mechanically signed) signatures and facsimile corporate seals that: (A) contains language stating that the surety will be bound by facsimile seals and signatures and (B) <u>also</u> contains an ORIGINAL corporate seal at the certification block. (An original seal is (I) a raised, crimped seal, or (II) a paper or foil corporate seal that is manually attached to the power-of-attorney.)

14. For purposes of the clause entitled "52.219-4 -- Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999)", the term "otherwise successful offer" means the lowest responsive bid from a responsible bidder prior to the application of any evaluation preference required by this clause.

The solicitation clause FAR 52.219-4 expressed that Small Disadvantaged Business (SDB) firms would receive both the HUBZone and SDB evaluation preference adjustments (See FAR clause 52.219-23). Guidance from the Office of the Under Secretary of Defense provides that DOD contracting activities, including the Department of the Army, shall suspend the use of price evaluation adjustments for SDB businesses in DOD Acquisitions, as prescribed in FAR subpart 19.11.

Therefore the clause 52.219-23 is not contained in this solicitation and no SDB evaluation preference adjustment will be utilized

- 15. The following options will not be exercised:
 - a. Option 2: Reach 1 Closures
 - b. Option 3: Reach 3 Entire Reach

The Government will NOT exercise the above referenced option items. Bidders should NOT enter bids for option items and therefore all applicable option items have been marked N/A on the bid schedule.

SECTION 00100 Bidding Schedule/Instructions to Bidders

CLAUSES INCORPORATED BY FULL TEXT

52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (JUN 99)

- (a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" followed by the DUNS number that identifies the offeror's name and address exactly as stated in the offer.
- (b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror, if located within the United States, should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:
- (1) Company name.
- (2) Company address.
- (3) Company telephone number.
- (4) Line of business.
- (5) Chief executive officer/key manager.
- (6) Date the company was started.
- (7) Number of people employed by the company.
- (8) Company affiliation.
- (c) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet Home Page at http://www.customerservice@dnb.com. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@mail.dnb.com.

(End of provision)

52.209-4001 BIDDER'S QUALIFICATIONS (APR 1984) FAR 9.105-1

Before a bid is considered for award, the bidder may be requested by the Government to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the work.

52.214-1 SOLICITATION DEFINITIONS--SEALED BIDDING (JUL 1987)

"Government" means United States Government.

"Offer" means "bid" in sealed bidding.

"Solicitation" means an invitation for bids in sealed bidding.

(End of provision)

52.214-3 AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)

- (a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.
- (b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, or (4) by facsimile, if facsimile bids are authorized in the solicitation. The Government must receive the acknowledgment by the time and at the place specified for receipt of bids.

(End of provision)

52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

52.214-5 SUBMISSION OF BIDS (MAR 1997)

- (a) Bids and bid modifications shall be submitted in sealed envelopes or packages (unless submitted by electronic means) (1) addressed to the office specified in the solicitation, and (2) showing the time and date specified for receipt, the solicitation number, and the name and address of the bidder.
- (b) Bidders using commercial carrier services shall ensure that the bid is addressed and marked on the outermost envelope or wrapper as prescribed in subparagraphs (a)(1) and (2) of this provision when delivered to the office specified in the solicitation.
- (c) Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice.
- (d) Facsimile bids, modifications, or withdrawals, will not be considered unless authorized by the solicitation.
- (e) Bids submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

52.214-7 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (NOV 1999)

- (a) Bidders are responsible for submitting bids, and any modifications or withdrawals, so as to reach the Government office designated in the invitation for bids (IFB) by the time specified in the IFB. If no time is specified in the IFB, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that bids are due.
- (b)(1) Any bid, modification, or withdrawal received at the Government office designated in the IFB after the exact time specified for receipt of bids is "late" and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late bid would not unduly delay the acquisition; and--
- (i) If it was transmitted through an electronic commerce method authorized by the IFB, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of bids; or
- (ii) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of bids and was under the Government's control prior to the time set for receipt of bids.
- (2) However, a late modification of an otherwise successful bid that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.
- (c) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the bid wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.
- (d) If an emergency or unanticipated event interrupts normal Government processes so that bids cannot be received at the Government office designated for receipt of bids by the exact time specified in the IFB and urgent Government requirements preclude amendment of the IFB, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.
- (e) Bids may be withdrawn by written notice received at any time before the exact time set for receipt of bids. If the IFB authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision at 52.214-31, Facsimile Bids. A bid may be

withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(End of provision)

52.214-18 PREPARATION OF BIDS--CONSTRUCTION (APR 1984)

- (a) Bids must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a bid must initial each erasure or change appearing on any bid form.
- (b) The bid form may require bidders to submit bid prices for one or more items on various bases, including--
- (1) Lump sum bidding;
- (2) Alternate prices;
- (3) Units of construction; or
- (4) Any combination of subparagraphs (1) through (3) above.
- (c) If the solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.
- (d) Alternate bids will not be considered unless this solicitation authorizes their submission.

52.214-19 CONTRACT AWARD--SEALED BIDDING--CONSTRUCTION (AUG 1996)

- (a) The Government will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, considering only price and the price-related factors specified elsewhere in the solicitation.
- (b) The Government may reject any or all bids, and waive informalities or minor irregularities in bids received.
- (c) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the bid.
- (d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)

Offers submitted in response to this solicitation shall be in the English language. Offers received in other than English shall be rejected.

(End of provision)

52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

Offers submitted in response to this solicitation shall be in terms of U.S. dollars. Offers received in other than U.S. dollars shall be rejected.

(End of provision)

52.214-4001 INQUIRIES - BID INFORMATION

(a) Inquiries:

Any questions regarding this solicitation should be directed to Tammy Moore, Contract Specialist, at telephone number (651) 290-5408 (collect calls not accepted). It is requested that all technical questions on the plans and specifications be submitted to the Contract Specialist by facsimile transmission to (651) 290-5706.

The Planholder's List and bid results can be found on the St. Paul District web site at http://www.mvp.usace.army.mil (click on "Doing Business With Us - Contracting/Bidders Info", then "St. Paul Electronic Bid Solicitations (EBS)").

(b) Bid Depository/Bid Opening Information:

Bids must be deposited prior to the date and time set for opening of bids. The bid depository is located in the Contracting Division, 6th Floor, of the St. Paul District, Corps of Engineers Centre, 190 Fifth Street East, St. Paul, Minnesota 55101-1638. A public bid opening will be held at the same location.

52.214-4002 ALL OR NONE QUALIFICATIONS (APR 1984) FAR 14.404-5

A bidder/offeror must quote on all items in this solicitation to be eligible for award. The Government will award on a "All or None" basis. Evaluation of bids/offers will be based, among other factors, upon the total price quoted for all items.

52.214-5000 ARITHMETIC DISCREPANCIES – EFARS

- (a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of bidding schedule as submitted by the bidder:
 - (1) Obviously misplaced decimal points will be corrected;

- (2) Discrepancy between unit price and extended price, the unit price will govern;
- (3) Apparent errors in extension of unit prices will be corrected;
- (4) Apparent errors in addition of lump sum and extended prices will be corrected.
- (b) For the purpose of bid evaluation, the government will proceed on the assumption that the bidder intends his bid to be evaluated on basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.
 - (c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

(End of statement)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Firm-Fixed Price contract resulting from this solicitation.

(End of clause)

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000)

- (a) Definitions. Construction material, designated country construction material, domestic construction material, foreign construction material, and NAFTA country construction material, as used in this provision, are defined in the clause of this solicitation entitled "Buy American Act--Balance of Payments Program--Construction Materials under Trade Agreements" (Federal Acquisition Regulation (FAR) clause 52.225-11).
- (b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.
- (c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.
- (2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.
- (d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.
- (2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

- (3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested--
- (i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
- (ii) May be accepted if revised during negotiations.

(End of provision)

52.232-38 SUBMISSION OF ELECTRONIC FUNDS TRANSFER INFORMATION WITH OFFER (MAY 1999)

The offeror shall provide, with its offer, the following information that is required to make payment by electronic funds transfer (EFT) under any contract that results from this solicitation. This submission satisfies the requirement to provide EFT information under paragraphs (b)(1) and (j) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration.

- (1) The solicitation number (or other procurement identification number).
- (2) The offeror's name and remittance address, as stated in the offer.
- (3) The signature (manual or electronic, as appropriate), title, and telephone number of the offeror's official authorized to provide this information.
- (4) The name, address, and 9-digit Routing Transit Number of the offeror's financial agent.
- (5) The offeror's account number and the type of account (checking, savings, or lockbox).
- (6) If applicable, the Fedwire Transfer System telegraphic abbreviation of the offeror's financial agent.
- (7) If applicable, the offeror shall also provide the name, address, telegraphic abbreviation, and 9-digit Routing Transit Number of the correspondent financial institution receiving the wire transfer payment if the offeror's financial agent is not directly on-line to the Fedwire and, therefore, not the receiver of the wire transfer payment.

(End of provision)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from

US army Corps of Engineers St. Paul District Contracting Division 190 Fifth Street East St. Paul, Minnesota 55101-1638

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

- (a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.
- (b) Site visits may be arranged during normal duty hours by contacting:

Name: Craig Johnson Address: Western Area O

Western Area Office

201 North 3rd Street Grand Forks, ND 58203

Telephone: 701-772-8292

52.236-4002 WORK PERFORMED BY THE CONTRACTOR

The successful bidder must furnish the Contracting Officer within 10 days after the award, the items of work which he will perform with his own forces, the percentage of the total work this represents, and the estimated cost thereof. (See Section 00700, clause entitled ("52.236-1, Performance of Work by the Contractor").

52.236-4005 UNAVAILABILITY OF UTILITY SERVICES

The responsibility shall be upon the Contractor to provide and maintain at its expense, adequate utilities for its use for construction and domestic consumption, and to install and maintain necessary connections and lines for same, but only at such locations and in such manner as may be approved by the Contracting Officer. Before final acceptance, temporary connections and lines installed by the Contractor shall be removed in a manner satisfactory to the Contracting Officer.

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es): http://www.arnet.gov

SECTION 00600 Representations & Certifications

CLAUSES INCORPORATED BY FULL TEXT

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

- (a) The offeror certifies that --
- (1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to –
- (i) Those prices,
- (ii) The intention to submit an offer, or
- (iii) The methods of factors used to calculate the prices offered:
- (2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and
- (3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.
- (b) Each signature on the offer is considered to be a certification by the signatory that the signatory --
- (1) Is the person in the offeror's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision; or
- (2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provison ______ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);
- (ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and
- (iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision.
- (c) If the offeror deletes or modifies subparagraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991)

- (a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this Certification.
- (b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989,--
- (1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;
- (2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and
- (3) He or she will include the language of this certification in all subcontract awards at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.
- (c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, Title 31, United States Code. Any person who makes an expenditure prohibited under this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

(End of provision)

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions.

"Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

verify the accuracy of the offeror's TIN.
(d) Taxpayer Identification Number (TIN).
TIN:
TIN has been applied for.
TIN is not required because:
Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;
Offeror is an agency or instrumentality of a foreign government;
Offeror is an agency or instrumentality of the Federal Government.
(e) Type of organization.
Sole proprietorship;
Partnership;
Corporate entity (not tax-exempt);
Corporate entity (tax-exempt);
Government entity (Federal, State, or local);
Foreign government;
International organization per 26 CFR 1.6049-4;
Other
(f) Common parent.
Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.
Name and TIN of common parent:
Name
TIN
(End of provision)

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

- (a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.
- (b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it () is a women-owned business concern.

(End of provision)

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

- (a)(1) The Offeror certifies, to the best of its knowledge and belief, that--
- (i) The Offeror and/or any of its Principals--
- (A) Are () are not () presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;
- (B) Have () have not (), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property;
- (C) Are () are not () presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.
- (ii) The Offeror has () has not (), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.
- (2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

- (b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- (c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a

determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

- (d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- (e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 2001) ALTERNATE I (OCT 2000) & ALTERNATE II (OCT 2000)

- (a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 234990.
- (2) The small business size standard is \$ 27.5 million.
- (3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.
- (b) Representations. (1) The offeror represents as part of its offer that it () is, () is not a small business concern.
- (2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it () is, () is not a small disadvantaged business concern as defined in 13 CFR 124.1002.
- (3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a women-owned small business concern.
- (4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a veteran-owned small business concern.
- (5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it () is, () is not a service-disabled veteran-owned small business concern.
- (6) (Complete only if offeror represented itself as small business concern in paragraph (b)(1) of this provision). The offeror represents, as part of its offer, that--
- (i) It () is, () is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR Part 126; and
- (ii) It () is, () is not a joint venture that complies with the requirements of 13 CFR Part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are

participating in the joint venture. (The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:) Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.
(7) (Complete if offeror represented itself as disadvantaged in paragraph (b)(2) of this provision.) The offeror shall check the category in which its ownership falls:
() Black American.
() Hispanic American.

- () Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).
- () Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).
- () Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).
- (c) Definitions. As used in this provision--

Service-disabled veteran-owned small business concern--

- (1) Means a small business concern--
- (i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and
- (ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.
- (2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

Small business concern means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern-

- (1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and
- (2) The management and daily business operations of which are controlled by one or more veterans.

Women-owned small business concern means a small business concern --

(1) That is at least 51 percent owned by one or more women; in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

- (2) Whose management and daily business operations are controlled by one or more women.
- (d) Notice.
- (1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.
- (2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--
- (i) Be punished by imposition of fine, imprisonment, or both;
- (ii) Be subject to administrative remedies, including suspension and debarment; and
- (iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.219-2 EQUAL LOW BIDS. (OCT 1995)

- (a) This provision applies to small business concerns only.
- (b) The bidder's status as a labor surplus area (LSA) concern may affect entitlement to award in case of tie bids. If the bidder wishes to be considered for this priority, the bidder must identify, in the following space, the LSA in which the costs to be incurred on account of manufacturing or production (by the bidder or the first-tier subcontractors) amount to more than 50 percent of the contract price.

(c) Failure to identify the labor surplus area as specified in paragraph (b) of this provision will preclude the bidder from receiving priority consideration. If the bidder is awarded a contract as a result of receiving priority consideration under this provision and would not have otherwise received award, the bidder shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

- (a) [] It has, [] has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;
- (b) [] It has, [] has not, filed all required compliance reports; and
- (c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will

be obtained before subcontract awards.

(End of provision)

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)

- (a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.
- (b) By signing this offer, the offeror certifies that--
- (1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or
- (2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)
- [] (i) The facility does not manufacture, process or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);
- [] (ii) The facility does not have 10 or more full-time employees as specified in section 313.(b)(1)(A) of EPCRA 42 U.S.C. 11023(b)(1)(A);
- [] (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);
- [] (iv) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or
- [] (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

52.225-11 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (DEC 2001)

(a) Definitions. As used in this clause--

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or

work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

- (1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the end product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or
- (2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Denmark, Djibouti, Equatorial Guinea, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Iceland, Ireland, Israel, Italy, Japan.

Kiribati, Korea, Republic of, Lesotho, Liechtenstein, Luxembourg, Malawi, Maldives, Mali, Mozambique, Nepal, Netherlands, Niger, Norway, Portugal, Rwanda.

Sao Tome and Principe, Sierra Leone, Singapore, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a designated country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

Domestic construction material means--

- (1) An unmanufactured construction material mined or produced in the United States; or
- (2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

North American Free Trade Agreement country means Canada or Mexico.

North American Free Trade Agreement country construction material means a construction material that--

- (1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) country; or
- (2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

- (b) Construction materials. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) and the Balance of Payments Program by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and the North American Free Trade Agreement (NAFTA) apply to this acquisition. Therefore, the Buy American Act and Balance of Payments Program restrictions are waived for designated country and NAFTA country construction materials.
- (2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.
- (3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows: None
- (4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--
- (i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;
- (ii) The application of the restriction of the Buy American Act or Balance of Payments Program to a particular construction material would be impracticable or inconsistent with the public interest; or
- (iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.
- (c) Request for determination of inapplicability of the Buy American Act or Balance of Payments Program. (1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--
- (A) A description of the foreign and domestic construction materials;
- (B) Unit of measure;
- (C) Quantity;
- (D) Price;
- (E) Time of delivery or availability;
- (F) Location of the construction project;
- (G) Name and address of the proposed supplier; and
- (H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.
- (ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.
- (iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

- (iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.
- (2) If the Government determines after contract award that an exception to the Buy American Act or Balance of Payments Program applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.
- (3) Unless the Government determines that an exception to the Buy American Act or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.
- (d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

52.232-38 SUBMISSION OF ELECTRONIC FUNDS TRANSFER INFORMATION WITH OFFER (MAY 1999)

The offeror shall provide, with its offer, the following information that is required to make payment by electronic funds transfer (EFT) under any contract that results from this solicitation. This submission satisfies the requirement to provide EFT information under paragraphs (b)(1) and (j) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration.

- (1) The solicitation number (or other procurement identification number).
- (2) The offeror's name and remittance address, as stated in the offer.

- (3) The signature (manual or electronic, as appropriate), title, and telephone number of the offeror's official authorized to provide this information.
- (4) The name, address, and 9-digit Routing Transit Number of the offeror's financial agent.
- (5) The offeror's account number and the type of account (checking, savings, or lockbox).
- (6) If applicable, the Fedwire Transfer System telegraphic abbreviation of the offeror's financial agent.
- (7) If applicable, the offeror shall also provide the name, address, telegraphic abbreviation, and 9-digit Routing Transit Number of the correspondent financial institution receiving the wire transfer payment if the offeror's financial agent is not directly on-line to the Fedwire and, therefore, not the receiver of the wire transfer payment.

(End of provision)

252.209-7001 DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) "Definitions."

As used in this provision --

- (a) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.
- (2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for such acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.
- (3) "Significant interest" means --
- (i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;
- (ii) Holding a management position in the firm, such as a director or officer;
- (iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;
- (iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or
- (v) Holding 50 percent or more of the indebtness of a firm.
- (b) "Prohibition on award."

In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary or, in the case of a subsidiary, the firm that owns the subsidiary, unless a waiver is granted by the Secretary of Defense.

(c) "Disclosure."

If the government of a terrorist country has a significant interest in the Offeror or a subsidiary of the Offeror, the Offeror shall disclosure such interest in an attachment to its offer. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include --

- (1) Identification of each government holding a significant interest; and
- (2) A description of the significant interest held by each government.

(End of provision)

252.225-7017 PROHIBITION ON AWARD TO COMPANIES OWNED BY THE PEOPLE'S REPUBLIC OF CHINA (FEB 2000)

- (a) Definition. "People's Republic of China," as used in this provision, means the government of the People's Republic of China, including its political subdivisions, agencies, and instrumentalities.
- (b) Prohibition on award. Section 8120 of the Department of Defense Appropriations Act for fiscal year 1999 (Pub. L. 105-262), as amended by Section 144 of Title I, Division C, of the Omnibus Consolidated and Emergency Supplemental Appropriations Act, 1999 (Pub. L. 105-277), prohibits the award of a contract under this solicitation to any company in which the Director of Defense Procurement (Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics)) has determined that the People's Republic of China or the People's Liberation Army of the People's Republic of China owns more than 50 percent interest.
- (c) Representation. By submission of an offer, the offeror represents that the People's Republic of China or the People's Liberation Army of the People's Republic of China does not own more than 50 percent interest in the offeror.

(End of provision)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

- (a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.
- (b) Representation. The Offeror represents that it:
- ____(1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
- _____(2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
- (c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

SECTION 00700 Contract Clauses

CLAUSES INCORPORATED BY FULL TEXT

52.202-1 DEFINITIONS (DEC 2001) -- ALTERNATE I (MAY 2001)

- (a) Agency head or head of the agency means the Secretary (Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, unless otherwise indicated, including any deputy or assistant chief official of the executive agency.
- (b) "Commercial component" means any component that is a commercial item.
- (c) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and that-
- (i) Has been sold, leased, or licensed to the general public; or
- (ii) Has been offered for sale, lease, or license to the general public;
- (2) Any item that evolved from an item described in paragraph (c)(1) of this clause through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation;
- (3) Any item that would satisfy a criterion expressed in paragraphs (c)(1) or (c)(2) of this clause, but for-
- (i) Modifications of a type customarily available in the commercial marketplace; or
- (ii) Minor modifications of a type not customarily available in the commercial marketplace made to meet Federal Government requirements. "Minor" modifications means modifications that do not significantly alter the nongovernmental function or essential physical characteristics of an item or component, or change the purpose of a process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor;
- (4) Any combination of items meeting the requirements of paragraphs (c)(1), (2), (3), or (5) of this clause that are of a type customarily combined and sold in combination to the general public;
- (5) Installation services, maintenance services, repair services, training services, and other services if--
- (i) Such services are procured for support of an item referred to in paragraph (c)(1), (2), (3), or (4) of this definition, regardless of whether such services are provided by the same source or at the same time as the item; and
- (ii) The source of such services provides similar services contemporaneously to the general public under terms and conditions similar to those offered to the Federal Government:
- (6) Services of a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed under standard commercial terms and conditions. This does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed. For purposes of these services--

- (i) Catalog price means a price included in a catalog, price list, schedule, or other form that is regularly maintained by the manufacturer or vendor, is either published or otherwise available for inspection by customers, and states prices at which sales are currently, or were last, made to a significant number of buyers constituting the general public; and
- (ii) Market prices means current prices that are established in the course of ordinary trade between buyers and sellers free to bargain and that can be substantiated through competition or from sources independent of the offerors.
- (7) Any item, combination of items, or service referred to in subparagraphs (c)(1) through (c)(6), notwithstanding the fact that the item, combination of items, or service is transferred between or among separate divisions, subsidiaries, or affiliates of a Contractor; or
- (8) A nondevelopmental item, if the procuring agency determines the item was developed exclusively at private expense and sold in substantial quantities, on a competitive basis, to multiple State and local Governments.
- (d) Component means any item supplied to the Government as part of an end item or of another component, except that for use in 52.225-9, and 52.225-11 see the definitions in 52.225-9(a) and 52.225-11(a).
- (e) Contracting Officer means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.
- (f) Nondevelopmental item means--
- (1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement;
- (2) Any item described in paragraph (f)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or
- (3) Any item of supply being produced that does not meet the requirements of paragraph (f)(1) or (f)(2) solely because the item is not yet in use.

"Chief of Contracting Office" means the Chief of the Contracting Division at a District, or the Director of Contracting at a Division, Center, Laboratory, or other support activity.

"Command" means each USACE Division, each USACE District, The U.S. Army Engineering and Support Center (HNC), Transatlantic Programs Center (TAC), Transatlantic Programs Center (Europe) (TAE), Topographic Engineer Center (TEC), Cold Regions Research and Engineering Laboratory (CRREL), Construction Engineering Research Laboratory (CERL), Humphreys Engineering Center Support Activity (HECSA), and Waterways experiment Station (WES).

"Commander" means the commanding officer of each USACE district and each USACE division, and the director or commander of HNC, TAC, TAE, ETL, CRREL, CERL, HECSA and WES.

"Head of Contracting Activity (HCA)" for USACE means the Chief of Engineers.

Centers. For determining contracting authority levels for this regulation, Centers (HNC, and TAC) will equate to a Division. As a subordinate unit to TAC, TAE's contracting authority will therefore equate to that of a district.

Level higher than the contracting officer. When a District or TAE chief of contracting is the contracting officer, a "level higher than the contracting officer" means the Division or Center Director of Contracting. When an operating Division, Center or Laboratory Director/Chief of Contracting is the contracting officer a "level higher than the contracting officer" means the PARC.

Local Cooperation Agreements (LCAs). See Project Cooperation Agreements.

Project Cooperation Agreements. Formerly referred to as Local Cooperation Agreements, these are agreements under 31 U.S.C. 6305 and 42 U.S.C. 1962d-5b. They are not contracts as defined by the FAR.

"USACE and HQUSACE" means the United States Army Corps of Engineers and its headquarters, respectively.

52.203-3 GRATUITIES (APR 1984)

- (a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--
- (1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and
- (2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.
- (b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.
- (c) If this contract is terminated under paragraph (a) of this clause, the Government is entitled-
- (1) To pursue the same remedies as in a breach of the contract; and
- (2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)
- (d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent

fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

(End of clause)

52.203-7 ANTI-KICKBACK PROCEDURES. (JUL 1995)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract.

"Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor," as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

- (b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from -
- (1) Providing or attempting to provide or offering to provide any kickback;
- (2) Soliciting, accepting, or attempting to accept any kickback; or
- (3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.
- (c)(1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.
- (2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.
- (3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.
- (4) The Contracting Officer may (i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or (ii) direct that the Prime Contractor withhold, from sums owed a subcontractor under the prime contract, the amount of any kickback. The Contracting Officer may order the monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.
- (5) The Contractor agrees to incorporate the substance of this clause, including this subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed \$100,000.

52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

- (a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the 1996 National Defense Authorization Act for Fiscal Year 1996 (Pub. L. 104-106), the Government may-
- (1) Cancel the solicitation, if the contract has not yet been awarded or issued; or
- (2) Rescind the contract with respect to which--
- (i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27(a) or (b) of the Act for the purpose of either--
- (A) Exchanging the information covered by such subsections for anything of value; or
- (B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

- (ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense punishable under subsections 27(e)(1) of the Act.
- (b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.
- (c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

- (a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract by the amount of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27 (a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.
- (b) The price or fee reduction referred to in paragraph (a) of this clause shall be-
- (1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;
- (2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;
- (3) For cost-plus-award-fee contracts--
- (i) The base fee established in the contract at the time of contract award;
- (ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.
- (4) For fixed-price-incentive contracts, the Government may-
- (i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award; or
- (ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.
- (5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.
- (c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount

of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal action," as used in this clause, means any of the following Federal actions:

- (1) The awarding of any Federal contract.
- (2) The making of any Federal grant.
- (3) The making of any Federal loan.
- (4) The entering into of any cooperative agreement.
- (5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

- (1) An individual who is appointed to a position in the Government under Title 5, United States Code, including a position under a temporary appointment.
- (2) A member of the uniformed services, as defined in subsection 101(3), Title 37, United States Code.
- (3) A special Government employee, as defined in section 202, Title 18, United States Code.
- (4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, Title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

- (1) Section 1352 of Title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.
- (3) The prohibitions of the Act do not apply under the following conditions:
- (i) Agency and legislative liaison by own employees.
- (A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.
- (B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

- (C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:
- (1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.
- (2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.
- (D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--
- (1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;
- (2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and
- (3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.
- (E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.
- (ii) Professional and technical services.
- (A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--
- (1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.
- (2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.
- (B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the

engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

- (C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.
- (D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.
- (E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.
- (c) Disclosure.
- (1) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.
- (2) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--
- (i) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- (ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or
- (iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.
- (3) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding \$100,000 under the Federal contract.
- (4) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.
- (d) Agreement. The Contractor agrees not to make any payment prohibited by this clause.
- (e) Penalties.
- (1) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.
- (2) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.
- (f) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

52.204-4 PRINTED OR COPIED DOUBLE-SIDED ON RECYCLED PAPER (AUG 2000)

- (a) Definitions. As used in this clause--
- "Postconsumer material" means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. Postconsumer material is a part of the broader category of "recovered material." For paper and paper products, postconsumer material means "postconsumer fiber" defined by the U.S. Environmental Protection Agency (EPA) as--
- (1) Paper, paperboard, and fibrous materials from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including: used corrugated boxes; old newspapers; old magazines; mixed waste paper; tabulating cards; and used cordage; or
- (2) All paper, paperboard, and fibrous materials that enter and are collected from municipal solid waste; but not
- (3) Fiber derived from printers' over-runs, converters' scrap, and over-issue publications.
- "Printed or copied double-sided" means printing or reproducing a document so that information is on both sides of a sheet of paper.
- "Recovered material," for paper and paper products, is defined by EPA in its Comprehensive Procurement Guideline as "recovered fiber" and means the following materials:
- (1) Postconsumer fiber; and
- (2) Manufacturing wastes such as--
- (i) Dry paper and paperboard waste generated after completion of the papermaking process (that is, those manufacturing operations up to and including the cutting and trimming of the paper machine reel into smaller rolls or rough sheets) including: envelope cuttings, bindery trimmings, and other paper and paperboard waste resulting from printing, cutting, forming, and other converting operations; bag, box, and carton manufacturing wastes; and butt rolls, mill wrappers, and rejected unused stock; and
- (ii) Repulped finished paper and paperboard from obsolete inventories of paper and paperboard manufacturers, merchants, wholesalers, dealers, printers, converters, or others.
- (b) In accordance with Section 101 of Executive Order 13101 of September 14, 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition, the Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed or copied double-sided on recycled paper that meet minimum content standards specified in Section 505 of Executive Order 13101, when not using electronic commerce methods to submit information or data to the Government.
- (c) If the Contractor cannot purchase high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock meeting the 30 percent postconsumer material standard for use in submitting paper documents to the Government, it should use paper containing no less than 20 percent postconsumer material. This lesser standard should be used only when paper meeting the 30 percent postconsumer material standard is not obtainable at a reasonable price or does not meet reasonable performance standards.

52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

- (a) The Government suspends or debars Contractors to protect the Government's interests. The Contractor shall not enter into any subcontract in excess of the \$25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.
- (b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed \$25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principles, is or is not debarred, suspended, or proposed for debarment by the Federal Government.
- (c) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs). The notice must include the following:
- (1) The name of the subcontractor.
- (2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.
- (3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.
- (4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(End of clause)

52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 730 days after the Contractor received the notice to proceed. * The time stated for completion shall include final cleanup of the premises.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$950.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-13 TIME EXTENSIONS (SEP 2000)

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide an equitable readjustment of liquidated damages under the new completion schedule.

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgement of the Contracting Officer, is justified.

52.214-26 AUDIT AND RECORDS--SEALED BIDDING. (OCT 1997)

- (a) As used in this clause, records includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.
- (b) Cost or pricing data. If the Contractor has been required to submit cost or pricing data in connection with the pricing of any modification to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to--
- (1) The proposal for the modification;
- (2) The discussions conducted on the proposal(s), including those related to negotiating;

- (3) Pricing of the modification; or
- (4) Performance of the modification.
- (c) Comptroller General. In the case of pricing any modification, the Comptroller General of the United States, or an authorized representative, shall have the same rights as specified in paragraph (b) of this clause.
- (d) Availability. The Contractor shall make available at its office at all reasonable times the materials described in reproduction, until 3 years after final payment under this contract, or for any other period specified in Subpart 4.7 of the Federal Acquisition Regulation (FAR). FAR Subpart 4.7, Contractor Records Retention, in effect on the data of this contract, is incorporated by reference in its entirety and made a part of this contract.
- (1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement.
- (2) Records pertaining to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to the performance of this contract shall be made available until disposition of such appeals, litigation, or claims.
- (e) The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (e), in all subcontracts expected to exceed the threshold in FAR 15.403-4(a)(1) for submission of cost or pricing data.

52.214-27 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA - MODIFICATIONS - SEALED BIDDING. (OCT 1997)

- (a) This clause shall become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for the submission of cost or pricing data at FAR 15.403-4(a)(1), except that this clause does not apply to a modification if an exception under FAR 15.403-1(b) applies.
- (1) Based on adequate price competition;
- (2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or
- (3) Set by law or regulation.
- (b) If any price, including profit, negotiated in connection with any modification under this clause, was increased by any significant amount because
- (1) the Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data;
- (2) a subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data; or
- (3) any of these parties furnished data of any description that were not accurate, the price shall be reduced accordingly and the contract shall be modified to reflect the reduction. This right to a price reduction is limited to that resulting from defects in data relating to modifications for which this clause becomes operative under paragraph (a) above.

- (c) Any reduction in the contract price under paragraph (b) above due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which:
- (1) the actual subcontract; or
- (2) the actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.
- (d) If the Contracting Officer determines under paragraph (b) of this clause that a price or cost reduction should be made:
- (1) the Contractor agrees not to raise the following matters as a defense:
- (i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted:
- (ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer;
- (iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract; or
- (iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.
- (2) Except as prohibited by subdivision (d)(2)(ii) of this clause:
- (i) an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if:
- (A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and
- (B) The Contractor proves that the cost or pricing data were available before the date of agreement on the price of the contract (or price of the modification) and that the data were not submitted before such date.
- (ii) An offset shall not be allowed if:
- (A) The understated data was known by the Contractor to be understated when the Certificate of Current Cost or Pricing Data was signed; or (B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the date of agreement on price.
- (e) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid:
- (1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data which were incomplete, inaccurate, or noncurrent.

52.214-28 SUBCONTRACTOR COST OR PRICING DATA - MODIFICATIONS - SEALED BIDDING. (OCT 1997)

- (a) The requirements of paragraphs (b) and (c) of this clause shall:
- (1) become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for submission of cost or pricing data at (FAR) 48 CFR 15.403-4(a)(1); and
- (2) be limited to such modifications.
- (b) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4(a)(1), on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modifications involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4(a)(1), the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1(b) applies.
- (1) Based on adequate price competition;
- (2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or
- (3) Set by law or regulation.
- (c) The Contractor shall require the subcontractor to certify in substantially the form prescribed in subsection 15.406-2 of the Federal Acquisition Regulation that, to the best of its knowledge and belief, the data submitted under paragraph (b) above were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.
- (d) The Contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that, when entered into, exceeds the threshold for submission of cost or pricing data at FAR 15.403-4(a)(1).

52.217-4000 OPTION FOR ADDITIONAL WORK (Construction) (AUG 2000)

The Government may require the Contractor to perform the work identified as optional item(s) (CLIN(s) 0067 through 0083 at the price stated in the Schedule. The Contracting Officer may exercise the option(s) by written notice to the Contractor at any time before the required completion date stated Section 0700or any extensions thereto. The Contracting Officer shall provide the Contractor notice of the Government's intent to exercise the option at least 30 days in advance of exercising the option. Notice of intent to exercise the option shall not constitute an exercise of the option and shall not bind the government to exercise the option. If the Government should exercise the option(s) within 60 days of the required completion date or any extension thereto, the Government shall extend the required contract completion date to 60 days after the date of the exercise of the option.

Exercise of the option shall be evidenced on Standard Form 30, citing this Section as the authority for exercising the option. Notice of intent to exercise the option shall be considered to have been given at the earlier of the occurrence of any of the following events: deposit of written notification in the mail, receipt by the Contractor of a facsimile notifying it of the Government's intent to exercise the option, or receipt by the Contractor of an e-mail notifying the Contractor of the Government's intent to exercise the option. The option shall be considered to have been exercised at the time the Government deposits written notification to the Contractor in the mail or, if earlier, at the time written notice is delivered to the Contractor.

52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)

- (a) Definition. HUBZone small business concern, as used in this clause, means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.
- (b) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except--
- (i) Offers from HUBZone small business concerns that have not waived the evaluation preference;
- (ii) Otherwise successful offers from small business concerns;
- (iii) Otherwise successful offers of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is exceeded (see 25.402 of the Federal Acquisition Regulation (FAR)); and
- (iv) Otherwise successful offers where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government.
- (2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.
- (3) A concern that is both a HUBZone small business concern and a small disadvantaged business concern will receive the benefit of both the HUBZone small business price evaluation preference and the small disadvantaged business price evaluation adjustment (see FAR clause 52.219-23). Each applicable price evaluation preference or adjustment shall be calculated independently against an offeror's base offer.

These individual preference amounts shall be added together to arrive at the total evaluated price for that offer.

(c) Waiver of evaluation preference. A HUBZone small business concern may elect to waive the evaluation	
preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragr	apl
(d) of this clause do not apply if the offeror has waived the evaluation preference.	

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- (d) Agreement. A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for
- (1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

- (2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;
- (3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be will be spent on the concern's employees or the employees of other HUBZone small business concerns; or
- (4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.
- (e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.
- (f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)

- (a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.
- (b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

Definitions. As used in this contract--

HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

Service-disabled veteran-owned small business concern--

- (1) Means a small business concern--
- (i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and
- (ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

Small business concern means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

Small disadvantaged business concern means a small business concern that represents, as part of its offer that-

- (1) It has received certification as a small disadvantaged business concern consistent with 13 CFR part 124, subpart B:
- (2) No material change in disadvantaged ownership and control has occurred since its certification;
- (3) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and
- (4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

Veteran-owned small business concern means a small business concern-

- (1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and
- (2) The management and daily business operations of which are controlled by one or more veterans.

Women-owned small business concern means a small business concern-

- (1) That is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and
- (2) Whose management and daily business operations are controlled by one or more women.
- (d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a veteran-owned small business concern, a service-disabled veteran-owned small business concern, a HUBZone small business concern, a small disadvantaged business concern, or a women-owned small business concern.

(End of clause)

52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (OCT 2001) ALTERNATE I (OCT 2001)

- (a) This clause does not apply to small business concerns.
- (b) Definitions. As used in this clause--

Commercial item means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

Commercial plan means a subcontracting plan (including goals) that covers the offeror's fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (e.g., division, plant, or product line).

Individual contract plan means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror's planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

Master plan means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

Subcontract means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

- (c) The apparent low bidder, upon request by the Contracting Officer, shall submit a subcontracting plan, where applicable, that separately addresses subcontracting with small business, veteran-owner small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns. If the bidder is submitting an individual contract plan, the plan must separately address subcontracting with small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be submitted within the time specified by the Contracting Officer. Failure to submit the subcontracting plan shall make the bidder ineligible for the award of a contract.
- (d) The offeror's subcontracting plan shall include the following:
- (1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. Service-disabled veteran-owned small business concerns, and offerors may include them within the subcontracting plan goal for veteran-owned small business concerns. A separate goal for service-disabled veteran-owned small business concerns is not required. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.
- (2) A statement of--
- (i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;
- (ii) Total dollars planned to be subcontracted to small business concerns;
- (iii) Total dollars planned to be subcontracted to veteran-owned small business concerns;
- (iv) Total dollars planned to be subcontracted to service-disabled veteran-owned small business;
- (v) Total dollars planned to be subcontracted to HUBZone small business concerns;
- (vi) Total dollars planned to be subcontracted to small disadvantaged business concerns; and
- (vi) Total dollars planned to be subcontracted to women-owned small business concerns.

- (3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to--
- (i) Small business concerns;
- (ii) Veteran-owned small business concerns;
- (iii) Service-disabled veteran-owned small business concerns;
- (iv) HUBZone small business concerns;
- (v) Small disadvantaged business concerns; and
- (vi) Women-owned small business concerns.
- (4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.
- (5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, (iii) Service-disabled veteran-owned small business concerns; HUBZone small, small disadvantaged, and women-owned small business source list. Use of PRO-Net as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, or publicizing subcontracting opportunities) in this clause.
- (6) A statement as to whether or not the offeror in included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with—
- (i) Small business concerns;
- (ii) Veteran-owned small business concerns;
- (iii) Service-disabled veteran-owned small business concerns;
- (iv) HUBZone small business concerns;
- (v) Small disadvantaged business concerns; and
- (vi) Women-owned small business concerns.
- (7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.
- (8) A description of the efforts the offeror will make to assure that small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business and women-owned small business concerns have an equitable opportunity to compete for subcontracts.
- (9) Assurances that the offeror will include the clause of this contract entitled ``Utilization of Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of \$500,000 (\$1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

- (10) Assurances that the offeror will--
- (i) Cooperate in any studies or surveys as may be required;
- (ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;
- (iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with paragraph (j) of this clause. The reports shall provide information on subcontract awards to small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, women-owned small business concerns, and Historically Black Colleges and Universities and Minority Institutions. Reporting shall be in accordance with the instructions on the forms or as provided in agency regulations.
- (iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.
- (11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated)
- (i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, veteran-owner small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.
- (ii) Organizations contacted in an attempt to locate sources that are small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, or womenowned small business concerns.
- (iii) Records on each subcontract solicitation resulting in an award of more than \$100,000, indicating--
- (A) Whether small business concerns were solicited and, if not, why not;
- (B) Whether veteran-owned small business concerns were solicited and, if not, why not;
- (C) Whether service-disabled veteran-owned small business concerns were solicited and, if not, why not;
- (D) Whether HUBZone small business concerns were solicited and, if not, why not;
- (E) Whether small disadvantaged business concerns were solicited and, if not, why not;
- (F) Whether women-owned small business concerns were solicited and, if not, why not; and
- (G) If applicable, the reason award was not made to a small business concern.
- (iv) Records of any outreach efforts to contact--
- (A) Trade associations;
- (B) Business development organizations;
- (C) Conferences and trade fairs to locate small, HUBZone small, small disadvantaged, and women-owned small business sources; and

- (D) Veterans service organizations.
- (v) Records of internal guidance and encouragement provided to buyers through--
- (A) Workshops, seminars, training, etc.; and
- (B) Monitoring performance to evaluate compliance with the program's requirements.
- (vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.
- (e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:
- (1) Assist small business, veteran-owner small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, veteran-owner small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.
- (2) Provide adequate and timely consideration of the potentialities of small business, veteran-owner small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all ``make-or-buy" decisions.
- (3) Counsel and discuss subcontracting opportunities with representatives of small business, veteran-owner small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.
- (4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, veteran-owner small business, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.
- (f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided--
- (1) the master plan has been approved,
- (2) the offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer, and
- (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.
- (g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

- (h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.
- (i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.
- (j) The Contractor shall submit the following reports:
- (1) Standard Form 294, Subcontracting Report for Individual Contracts. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.
- (2) Standard Form 295, Summary Subcontract Report. This report encompasses all of the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by North American Industry Classification System (NAICS) Industry Subsector. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant NAICS Industry Subsector and report all awards to that subcontractor under its predominant NAICS Industry Subsector.

52.219-16 LIQUIDATED DAMAGES-SUBCONTRACTING PLAN (JAN 1999)

- (a) Failure to make a good faith effort to comply with the subcontracting plan, as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.
- (b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion or, in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.
- (c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.
- (d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of

the Contracting Officer under this clause on behalf of all agencies with contracts covered by the commercial plan.

- (e) The Contractor shall have the right of appeal, under the clause in this contract entitled Disputes, from any final decision of the Contracting Officer.
- (f) Liquidated damages shall be in addition to any other remedies that the Government may have.

(End of clause)

52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)

If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice, including all relevant information, to the Contracting Officer.

52.222-3 CONVICT LABOR (AUG 1996)

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

- (a)(1) The worker is paid or is in an approved work training program on a voluntary basis;
- (2) Representatives of local union central bodies or similar labor union organizations have been consulted;
- (3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and
- (4) The rates of pay and other conditions of employment will not be less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and
- (b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

(End of clause)

52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION. (SEP 2000)

- (a) Overtime requirements. No Contractor or subcontractor employing laborers or mechanics (see Federal Acquisition Regulation 22.300) shall require or permit them to work over 40 hours in any workweek unless they are paid at least 1 and 1/2 times the basic rate of pay for each hour worked over 40 hours.
- (b) Violation; liability for unpaid wages; liquidated damages. The responsible Contractor and subcontractor are liable for unpaid wages if they violate the terms in paragraph (a) of this clause. In addition, the Contractor and subcontractor are liable for liquidated damages payable to the Government. The Contracting Officer will assess liquidated damages at the rate of \$10 per affected employee for each calendar day on which the employer required or permitted the employee to work in excess of the standard workweek of 40 hours without paying overtime wages required by the Contract Work Hours and Safety Standards Act.
- (c) Withholding for unpaid wages and liquidated damages. The Contracting Officer will withhold from payments due under the contract sufficient funds required to satisfy any Contractor or subcontractor liabilities for unpaid wages and liquidated damages. If amounts withheld under the contract are insufficient to satisfy Contractor or subcontractor liabilities, the Contracting Officer will withhold payments from other Federal or Federally assisted contracts held by the same Contractor that are subject to the Contract Work Hours and Safety Standards Act.
- (d) Payrolls and basic records.
- (1) The Contractor and its subcontractors shall maintain payrolls and basic payroll records for all laborers and mechanics working on the contract during the contract and shall make them available to the Government until 3 years after contract completion. The records shall contain the name and address of each employee, social security number, labor classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. The records need not duplicate those required for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.
- (2) The Contractor and its subcontractors shall allow authorized representatives of the Contracting Officer or the Department of Labor to inspect, copy, or transcribe records maintained under paragraph (d)(1) of this clause. The Contractor or subcontractor also shall allow authorized representatives of the Contracting Officer or Department of Labor to interview employees in the workplace during working hours.
- (e) Subcontracts. The Contractor shall insert the provisions set forth in paragraphs (a) through (d) of this clause in subcontracts exceeding \$100,000 and require subcontractors to include these provisions in any lower tier subcontracts. The Contractor shall be responsible for compliance by any subcontractor or lower-tier subcontractor with the provisions set forth in paragraphs (a) through (d) of this clause.

(End of clause)

52.222-6 DAVIS-BACON ACT (FEB 1995)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for

bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- (b)(1) The Contracting Officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met:
- (i) The work to be performed by the classification requested is not performed by a classification in the wage determination
- (ii) The classification is utilized in the area by the construction industry.
- (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (2) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.
- (3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.
- (4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- (c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, That the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may

require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

52.222-7 WITHHOLDING OF FUNDS (FEB 1988)

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

52.222-8 PAYROLLS AND BASIC RECORDS (FEB 1988)

- (a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
- (b)(1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.
- (2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--
- (i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;
- (ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during

the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

- (iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.
- (4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.
- (c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

52.222-9 APPRENTICES AND TRAINEES (FEB 1988)

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

52.222-11 SUBCONTRACTS (LABOR STANDARDS (FEB 1988)

- (a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act-Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination-Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.
- (b)(1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.
- (2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the

Contracting Officer an updated completed SF 1413 for such additional subcontract.

52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)

- (a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

52.222-21 PROHIBITION OF SEGREGATED FACILITIES (FEB 1999)

- (a) Segregated facilities, as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.
- (b) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Opportunity clause in this contract.
- (c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Opportunity clause of this contract.

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

- (a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.
- (b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
1.2%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

- (c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.
- (d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer's identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.
- (e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is :

East Grand Forks, Polk County, Minnesota

52.222-26 EQUAL OPPORTUNITY (FEB 1999)

- (a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of \$10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) of this clause. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.
- (b) During performing this contract, the Contractor agrees as follows:
- (1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. However, it shall not be a violation of this clause for the Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation, in connection with employment opportunities on or near an Indian reservation, as permitted by 41 CFR 60-1.5.
- (2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.
- (3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.
- (4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
- (5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.
- (6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
- (7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. The Contractor shall also file Standard

Form 100 (EEO-1), or any successor form, as prescribed in 41 CFR part 60-1. Unless the Contractor has filed within the 12 months preceding the date of contract award, the Contractor shall, within 30 days after contract award, apply to either the regional Office of Federal Contract Compliance Programs (OFCCP) or the local office of the Equal Employment Opportunity Commission for the necessary forms.

- (8) The Contractor shall permit access to its premises, during normal business hours, by the contracting agency or the OFCCP for the purpose of conducting on-site compliance evaluations and complaint investigations. The Contractor shall permit the Government to inspect and copy any books, accounts, records (including computerized records), and other material that may be relevant to the matter under investigation and pertinent to compliance with Executive Order 11246, as amended, and rules and regulations that implement the Executive Order.
- (9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended; in the rules, regulations, and orders of the Secretary of Labor; or as otherwise provided by law.
- (10) The Contractor shall include the terms and conditions of subparagraphs (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.
- (11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting officer may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.
- (c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

(End of clause)

52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999)

(a) Definitions. "Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Deputy Assistant Secretary," as used in this clause, means Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, or a designee.

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

- (1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
- (2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);
- (3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

- (4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).
- (b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of \$10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.
- (c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.
- (d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.
- (e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.
- (f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
- (g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:
- (1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.
- (2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- (3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the

Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

- (4) Immediately notify the Deputy Assistant Secretary when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- (5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) of this clause.
- (6) Disseminate the Contractor's equal employment policy by--
- (i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;
- (ii) Including the policy in any policy manual and in collective bargaining agreements;
- (iii) Publicizing the policy in the company newspaper, annual report, etc.;
- (iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and
- (v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.
- (7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all on-site supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- (8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.
- (9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- (10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.
- (11) Validate all tests and other selection requirements where required under 41 CFR 60-3.
- (12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.
- (13) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have

- a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.
- (14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user rest rooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.
- (15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- (16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.
- (h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16) of this clause. The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16) of this clause, provided the Contractor-
- (1) Actively participates in the group;
- (2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;
- (3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;
- (4) Makes a good-faith effort to meet its individual goals and timetables; and
- (5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
- (i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.
- (j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
- (k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.
- (l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.
- (m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) of this clause, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Deputy Assistant Secretary shall take action as prescribed in 41 CFR 60-4.8.

- (n) The Contractor shall designate a responsible official to--
- (1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;
- (2) Submit reports as may be required by the Government; and
- (3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

52.222-35 EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA AND OTHER ELIGIBLE VETERANS (DEC 2001)

(a) Definitions. As used in this clause--

All employment openings means all positions except executive and top management, those positions that will be filled from within the Contractor's organization, and positions lasting 3 days or less. This term includes full-time employment, temporary employment of more than 3 days duration, and part-time employment.

Executive and top management means any employee--

- (1) Whose primary duty consists of the management of the enterprise in which the individual is employed or of a customarily recognized department or subdivision thereof;
- (2) Who customarily and regularly directs the work of two or more other employees;
- (3) Who has the authority to hire or fire other employees or whose suggestions and recommendations as to the hiring or firing and as to the advancement and promotion or any other change of status of other employees will be given particular weight;
- (4) Who customarily and regularly exercises discretionary powers; and
- (5) Who does not devote more than 20 percent or, in the case of an employee of a retail or service establishment, who does not devote more than 40 percent of total hours of work in the work week to activities that are not directly and closely related to the performance of the work described in paragraphs (1) through (4) of this definition. This paragraph (5) does not apply in the case of an employee who is in sole charge of an establishment or a physically separated branch establishment, or who owns at least a 20 percent interest in the enterprise in which the individual is employed.

Other eligible veteran means any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized.

Positions that will be filled from within the Contractor's organization means employment openings for which the Contractor will give no consideration to persons outside the Contractor's organization (including any affiliates, subsidiaries, and parent companies) and includes any openings the Contractor proposes to fill from regularly established "recall" lists. The exception does not apply to a particular opening once an employer decides to consider applicants outside of its organization.

Qualified special disabled veteran means a special disabled veteran who satisfies the requisite skill, experience, education, and other job-related requirements of the employment position such veteran holds or desires, and who, with or without reasonable accommodation, can perform the essential functions of such position.

Special disabled veteran means--

- (1) A veteran who is entitled to compensation (or who but for the receipt of military retired pay would be entitled to compensation) under laws administered by the Department of Veterans Affairs for a disability--
- (i) Rated at 30 percent or more; or
- (ii) Rated at 10 or 20 percent in the case of a veteran who has been determined under 38 U.S.C. 3106 to have a serious employment handicap (i.e., a significant impairment of the veteran's ability to prepare for, obtain, or retain employment consistent with the veteran's abilities, aptitudes, and interests); or
- (2) A person who was discharged or released from active duty because of a service-connected disability.

Veteran of the Vietnam era means a person who--

- (1) Served on active duty for a period of more than 180 days and was discharged or released from active duty with other than a dishonorable discharge, if any part of such active duty occurred--
- (i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or
- (ii) Between August 5, 1964, and May 7, 1975, in all other cases; or
- (2) Was discharged or released from active duty for a service-connected disability if any part of the active duty was performed--
- (i) In the Republic of Vietnam between February 28, 1961, and May 7, 1975; or
- (ii) Between August 5, 1964, and May 7, 1975, in all other cases.
- (b) General. (1) The Contractor shall not discriminate against the individual because the individual is a special disabled veteran, a veteran of the Vietnam era, or other eligible veteran, regarding any position for which the employee or applicant for employment is qualified. The Contractor shall take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans without discrimination based upon their disability or veterans' status in all employment practices such as--
- (i) Recruitment, advertising, and job application procedures;
- (ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff and rehiring;
- (iii) Rate of pay or any other form of compensation and changes in compensation;
- (iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;

- (v) Leaves of absence, sick leave, or any other leave;
- (vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;
- (vii) Selection and financial support for training, including apprenticeship, and on-the-job training under 38 U.S.C. 3687, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;
- (viii) Activities sponsored by the Contractor including social or recreational programs; and
- (ix) Any other term, condition, or privilege of employment.
- (2) The Contractor shall comply with the rules, regulations, and relevant orders of the Secretary of Labor issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended (38 U.S.C. 4211 and 4212).
- (c) Listing openings. (1) The Contractor shall immediately list all employment openings that exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract, and including those occurring at an establishment of the Contractor other than the one where the contract is being performed, but excluding those of independently operated corporate affiliates, at an appropriate local public employment service office of the State wherein the opening occurs. Listing employment openings with the U.S. Department of Labor's America's Job Bank shall satisfy the requirement to list jobs with the local employment service office.
- (2) The Contractor shall make the listing of employment openings with the local employment service office at least concurrently with using any other recruitment source or effort and shall involve the normal obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing of employment openings does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.
- (3) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State public employment agency in each State where it has establishments of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State agency, it need not advise the State agency of subsequent contracts. The Contractor may advise the State agency when it is no longer bound by this contract clause.
- (d) Applicability. This clause does not apply to the listing of employment openings that occur and are filled outside the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, the Virgin Islands of the United States, and Wake Island.
- (e) Postings. (1) The Contractor shall post employment notices in conspicuous places that are available to employees and applicants for employment.
- (2) The employment notices shall--
- (i) State the rights of applicants and employees as well as the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified employees and applicants who are special disabled veterans, veterans of the Vietnam era, and other eligible veterans; and
- (ii) Be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance Programs, Department of Labor (Deputy Assistant Secretary of Labor), and provided by or through the Contracting Officer.

- (3) The Contractor shall ensure that applicants or employees who are special disabled veterans are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled veteran, or may lower the posted notice so that it can be read by a person in a wheelchair).
- (4) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement, or other contract understanding, that the Contractor is bound by the terms of the Act and is committed to take affirmative action to employ, and advance in employment, qualified special disabled veterans, veterans of the Vietnam era, and other eligible veterans.
- (f) Noncompliance. If the Contractor does not comply with the requirements of this clause, the Government may take appropriate actions under the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.
- (g) Subcontracts. The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor. The Contractor shall act as specified by the Deputy Assistant Secretary of Labor to enforce the terms, including action for noncompliance.

52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)

- (a) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental disability. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified individuals with disabilities without discrimination based upon their physical or mental disability in all employment practices such as--
- (i) Recruitment, advertising, and job application procedures;
- (ii) Hiring, upgrading, promotion, award of tenure, demotion, transfer, layoff, termination, right of return from layoff, and rehiring;
- (iii) Rates of pay or any other form of compensation and changes in compensation;
- (iv) Job assignments, job classifications, organizational structures, position descriptions, lines of progression, and seniority lists;
- (v) Leaves of absence, sick leave, or any other leave;
- (vi) Fringe benefits available by virtue of employment, whether or not administered by the Contractor;
- (vii) Selection and financial support for training, including apprenticeships, professional meetings, conferences, and other related activities, and selection for leaves of absence to pursue training;
- (viii) Activities sponsored by the Contractor, including social or recreational programs; and
- (ix) Any other term, condition, or privilege of employment.
- (2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.
- (b) Postings. (1) The Contractor agrees to post employment notices stating--

- (i) The Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified individuals with disabilities; and
- (ii) The rights of applicants and employees.
- (2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. The Contractor shall ensure that applicants and employees with disabilities are informed of the contents of the notice (e.g., the Contractor may have the notice read to a visually disabled individual, or may lower the posted notice so that it might be read by a person in a wheelchair). The notices shall be in a form prescribed by the Deputy Assistant Secretary for Federal Contract Compliance of the U.S. Department of Labor (Deputy Assistant Secretary) and shall be provided by or through the Contracting Officer.
- (3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified individuals with physical or mental disabilities.
- (c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.
- (d) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of \$10,000 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Deputy Assistant Secretary to enforce the terms, including action for noncompliance.

52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS (DEC 2001)

- (a) Unless the Contractor is a State or local government agency, the Contractor shall report at least annually, as required by the Secretary of Labor, on--
- (1) The number of special disabled veterans, the number of veterans of the Vietnam era, and other eligible veterans in the workforce of the Contractor by job category and hiring location; and
- (2) The total number of new employees hired during the period covered by the report, and of the total, the number of special disabled veterans, the number of veterans of the Vietnam era, and the number of other eligible veterans; and
- (3) The maximum number and the minimum number of employees of the Contractor during the period covered by the report.
- (b) The Contractor shall report the above items by completing the Form VETS-100, entitled "Federal Contractor Veterans" Employment Report (VETS-100 Report)".
- (c) The Contractor shall submit VETS-100 Reports no later than September 30 of each year beginning September 30, 1988.
- (d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date--

- (1) As of the end of any pay period between July 1 and August 31 of the year the report is due; or
- (2) As of December 31, if the Contractor has prior written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).
- (e) The Contractor shall base the count of veterans reported according to paragraph (a) of this clause on voluntary disclosure. Each Contractor subject to the reporting requirements at 38 U.S.C. 4212 shall invite all special disabled veterans, veterans of the Vietnam era, and other eligible veterans who wish to benefit under the affirmative action program at 38 U.S.C. 4212 to identify themselves to the Contractor. The invitation shall state that--
- (1) The information is voluntarily provided;
- (2) The information will be kept confidential;
- (3) Disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment; and
- (4) The information will be used only in accordance with the regulations promulgated under 38 U.S.C. 4212.
- (f) The Contractor shall insert the terms of this clause in all subcontracts or purchase orders of \$25,000 or more unless exempted by rules, regulations, or orders of the Secretary of Labor.

52.223-5 POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION (APR 1998)

- (a) Executive Order 12856 of August 3, 1993, requires Federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)(42 U.S.C. 11001-11050) and the Pollution Prevention Act of 1990 (PPA)(42 U.S.C. 13101-13109).
- (b) The Contractor shall provide all information needed by the Federal facility to comply with the emergency planning reporting requirements of Section 302 of EPCRA; the emergency notice requirements of Section 304 of EPCRA; the list of Material Safety Data Sheets required by Section 311 of EPCRA; the emergency and hazardous chemical inventory forms of Section 312 of EPCRA; the toxic chemical release inventory of Section 313 of EPCRA, which includes the reduction and recycling information required by Section 6607 of PPA; and the toxic chemical reduction goals requirements of Section 3-302 of Executive Order 12856.

52.223-6 DRUG-FREE WORKPLACE (MAY 2001)

(a) Definitions. As used in this clause --

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to deter- mine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution,

dispensing, possession, or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract where employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

- (b) The Contractor, if other than an individual, shall-- within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--
- (1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;
- (2) Establish an ongoing drug-free awareness program to inform such employees about-
- (i) The dangers of drug abuse in the workplace;
- (ii) The Contractor's policy of maintaining a drug-free workplace;
- (iii) Any available drug counseling, rehabilitation, and employee assistance programs; and
- (iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
- (3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;
- (4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--
- (i) Abide by the terms of the statement; and
- (ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.
- (5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;
- (6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:
- (i) Taking appropriate personnel action against such employee, up to and including termination; or
- (ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and
- (7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1)

though (b)(6) of this clause.

- (c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.
- (d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.506, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

(End of clause)

52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 2000)

- (a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.
- (b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--
- (1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);
- (2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);
- (3) The facility does not meet the reporting thresholds of toxic chemicals established under of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);
- (4) The facility does not fall within Standard Industrial Classification Code (SIC) major groups 20 through 39 or their corresponding North American Industry Classification System (NAICS) sectors 31 through 33; or
- (5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.
- (c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--
- (1) The Contractor shall notify the Contracting Officer; and
- (2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

- (d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.
- (e) Except for acquisitions of commercial items, as defined in FAR Part 2, the Contractor shall--
- (1) For competitive subcontracts expected to exceed \$100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and
- (2) Include in any resultant subcontract exceeding \$100,000 (including all options), the substance of this clause, except this paragraph (e).

52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JUL 2000)

- (a) The Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States under regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries are Cuba, Iran, Iraq, Libya, North Korea, Sudan, the territory of Afghanistan controlled by the Taliban, and Serbia (excluding the territory of Kosovo).
- (b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the government of Iraq.
- (c) The Contractor shall insert this clause, including this paragraph (c), in all subcontracts.

(End of clause)

52.226-1 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES (JUN 2000)

(a) Definitions. As used in this clause:

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo or community that is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any ``Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C., chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership constitutes not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, that is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1542(c).

"Interested party" means a prime contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

- (b) The Contractor shall use its best efforts to give Indian organizations and Indian-owned economic enterprises (25 U.S.C. 1544) the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with efficient performance of its contract.
- (1) The Contracting Officer and the Contractor, acting in good faith, may rely on the representation of an Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status. In the event of a challenge to the representation of a subcontractor, the Contracting Officer will refer the matter to the U.S. Department of the Interior, Bureau of Indian Affairs (BIA), Attn: Chief, Division of Contracting and Grants Administration, 1849 C Street, NW., MS 2626-MIB, Washington, DC 20240-4000.

The BIA will determine the eligibility and notify the Contracting Officer. No incentive payment will be made within 50 working days of subcontract award or while a challenge is pending. If a subcontractor is determined to be an ineligible participant, no incentive payment will be made under the Indian Incentive Program.

- (2) The Contractor may request an adjustment under the Indian Incentive Program to the following:
- (i) The estimated cost of a cost-type contract.
- (ii) The target cost of a cost-plus-incentive-fee prime contract.
- (iii) The target cost and ceiling price of a fixed-price incentive prime contract.
- (iv) The price of a firm-fixed-price prime contract.
- (3) The amount of the adjustment to the prime contract is 5 percent of the estimated cost, target cost, or firm-fixed-price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.
- (4) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.
- (c) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, will authorize an incentive payment of 5 percent of the amount paid to the subcontractor. The Contracting Officer will seek funding in accordance with agency procedures.

(End of clause)

52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the

indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold (however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.)

52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)

- (a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.
- (b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.
- (c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the simplified acquisition threshold at (FAR) 2.101.to exceed the dollar amount set forth in 13.000 of the Federal Acquisition Regulation (FAR).

(End of clause)

52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.

52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

- (b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.
- (c) The amount of the bid guarantee shall be 20 percent of the bid price or \$3 million dollars, whichever is less.
- (d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.
- (e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if-

- (a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government.
- (b) Any surety fails to furnish reports on its financial condition as required by the Government;
- (c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or
- (d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting officer has the right to immediately draw on the ILC.

52.228-11 PLEDGES OF ASSETS (FEB 1992)

- (a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--
- (1) Pledge of assets; and
- (2) Standard Form 28, Affidavit of Individual Surety.
- (b) Pledges of assets from each person acting as an individual surety shall be in the form of--
- (1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;
- (2) A recorded lien on real estate. The offeror will be required to provide-

- (i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);
- (ii) Evidence of the amount due under any encumbrance shown in the evidence of title;
- (iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgated by the Appraisal Foundation.

52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

- (a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.
- (b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.
- (c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--
- (1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;
- (2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:
- (i) For contracts subject to the Miller Act, the later of-
- (A) One year following the expected date of final payment;
- (B) For performance bonds only, until completion of any warranty period; or
- (C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.
- (ii) For contracts not subject to the Miller Act, the later of--

- (A) 90 days following final payment; or
- (B) For performance bonds only, until completion of any warranty period.
- (d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of less than \$25 million in the past year, ILCs over \$5 million must be confirmed by another acceptable financial institution that had letter of credit business of less than \$25 million in the past year.

acceptable financial institution that had letter of credit business of less than \$25 million in the past year.
(e) The following format shall be used by the issuing financial institution to create an ILC:
[Issuing Financial Institution's Letterhead or Name and Address]
Issue Date
IRREVOCABLE LETTER OF CREDIT NO
Account party's name
Account party's address
For Solicitation No(for reference only)
TO: [U.S. Government agency]
[U.S. Government agency's address]
1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States \$ This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on, or any automatically extended expiration date.
2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.
3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the

account party (and confirming financial institution, if any) by the same means of delivery.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to

financial institution]. [state of confirming financial institution, if any, otherwise state of issuing
6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of th UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.
Sincerely,
[Issuing financial institution]
(f) The following format shall be used by the financial institution to confirm an ILC:
[Confirming Financial Institution's Letterhead or Name and Address]
(Date)
Our Letter of Credit Advice Number
Beneficiary: [U.S. Government agency]
Issuing Financial Institution:
Issuing Financial Institution's LC No.:
Gentlemen:
1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by [name of issuing financial institution] for drawings of up to United States dollars /U.S. \$ and expiring with our close of business on [the expiration date], or any automatically extended expiration date.
2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at
3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.
4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:
(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to conside this confirmation extended for any such additional period; or
(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.
5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of [state of confirming financial institution].

17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.
Sincerely,
[Confirming financial institution]
(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:
SIGHT DRAFT
[City, State]
(Date)
[Name and address of financial institution]
Pay to the order of [Beneficiary Agency] the sum of United States \$ This draft is drawn under Irrevocable Letter of Credit No
[Beneficiary Agency]
By:
(End of clause)

6. If this confirmation expires during an interruption of business of this financial institution as described in Article

52.228-15 PERFORMANCE AND PAYMENT BONDS--CONSTRUCTION (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

- (b) Amount of required bonds. Unless the resulting contract price is \$100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:
- (1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.
- (2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

- (3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.
- (ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.
- (c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.
- (d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.
- (e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

52.228-4002 INSURANCE

As referenced in Contract Clause: INSURANCE--WORK ON A GOVERNMENT INSTALLATION, the following types and amounts of insurance are required under this contract.

Type Amount

Worker's Compensation and Employer's Liability Insurance:

Coverage A Compliance with State of Minnesota and North Dakota

Worker's Compensation Worker's Compensation Law

Coverage B \$ 100,000

Employer's Liability

General Liability Insurance:

Bodily Injury \$1,000,000 per occurrence

Property Damage Not Required

Automobile Liability Insurance (Comprehensive Policy Form):

Bodily Injury \$ 500,000 per person and

\$1,000,000 per occurrence

Property Damage \$ 100,000 per occurrence

52.228-4005 WORK IN MNDOT RIGHT-OF-WAY

Portions of this work may be conducted within the right-of-way owned by the Minnesota Department of Transportation (MNDOT). The contractor shall perform no work in MNDOT's right-of-way until a permit for that work is issued to the contractor by MNDOT and a copy of the fully executed permit has been provided to the Corps Western Area Engineer.

52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991)

- (a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.
- "All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.
- "After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.
- "After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.
- (b) The contract price includes all applicable Federal, State, and local taxes and duties.
- (c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.
- (d) The contract price shall be decreased by the amount of any after-relieved Federal tax.
- (e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.
- (f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds \$250.
- (g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.
- (h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

(End of clause)

52.229-5 TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984)

The term "local taxes," as used in the Federal, State, and local taxes clause of this contract, includes taxes imposed by a possession of the United States or by Puerto Rico.

(End of clause)

52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)

- (a) Payment of price. The Government shall pay the Contractor the contract price as provided in this contract.
- (b) Progress payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.
- (1) The Contractor's request for progress payments shall include the following substantiation:
- (i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.
- (ii) A listing of the amount included for work performed by each subcontractor under the contract.
- (iii) A listing of the total amount of each subcontract under the contract.
- (iv) A listing of the amounts previously paid to each such subcontractor under the contract.
- (v) Additional supporting data in a form and detail required by the Contracting Officer.
- (2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--
- (i) Consideration is specifically authorized by this contract; and
- (ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.
- (c) Contractor certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

- (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
- (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhole or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and
(4) This certification is not to be construed as final acceptance of a subcontractor's performance.
(Name)
(Title)

(Date)

- (d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--
- (1) Notify the Contracting Officer of such performance deficiency; and
- (2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--
- (i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or
- (ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.
- (e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.
- (f) Title, liability, and reservation of rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as-
- (1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or
- (2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.
- (g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full

payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

- (h) Final payment. The Government shall pay the amount due the Contractor under this contract after-
- (1) Completion and acceptance of all work;
- (2) Presentation of a properly executed voucher; and
- (3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).
- (i) Limitation because of undefinitized work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.
- (j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--
- (1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and
- (2) Deducted from the next available payment to the Contractor.

52.232-17 INTEREST (JUNE 1996)

- (a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid. reproduce, prepare derivative works, distribute copies to the public, and (b) Amounts shall be due at the earliest of the following dates:
- (1) The date fixed under this contract.
- (2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.
- (3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.
- (4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of

refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.

52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)

- (a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.
- (b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.
- (c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (MAY 2001)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments and contract financing payments under the terms and conditions specified in this clause. Payment shall be considered as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in sections 2.101 and 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see subparagraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

- (a) Invoice payments. (1) Types of invoice payments. For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:
- (i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project:
- (A) The due date for making such payments shall be 14 days after receipt of the payment request by the designated billing office. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date shall be the 14th day after the date of the Contractor's payment request, provided a proper payment request is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.
- (B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, shall be as specified in the contract or, if not

specified, 30 days after approval for release to the Contractor by the Contracting Officer.

- (ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract):
- (A) The due date for making such payments shall be either the 30th day after receipt by the designated billing office of a proper invoice from the Contractor, or the 30th day after Government acceptance of the work or services completed by the Contractor, whichever is later. If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date shall be the 30th day after the date of the Contractor's invoice, provided a proper invoice is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.
- (B) On a final invoice where the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance shall be deemed to have occurred on the effective date of the contract settlement.
- (2) Contractor's invoice. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in subdivisions (a)(2)(i) through (a)(2)(ix) of this clause. If the invoice does not comply with these requirements, it shall be returned within 7 days after the date the designated billing office received the invoice, with a statement of the reasons why it is not a proper invoice. Untimely notification will be taken into account in computing any interest penalty owed the Contractor in the manner described in subparagraph (a)(4) of this clause.
- (i) Name and address of the Contractor.
- (ii) Invoice date. (The Contractor is encouraged to date invoices as close as possible to the date of mailing or transmission.)
- (iii) Contract number or other authorization for work or services performed (including order number and contract line item number).
- (iv) Description of work or services performed.
- (v) Delivery and payment terms (e.g., prompt payment discount terms).
- (vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).
- (vii) Name (where practicable), title, phone number, and mailing address of person to be notified in the event of a defective invoice.
- (viii) For payments described in subdivision (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.
- (ix) Any other information or documentation required by the contract.
- (x) While not required, the Contractor is strongly encouraged to assign an identification number to each invoice.
- (3) Interest penalty. An interest penalty shall be paid automatically by the designated payment office, without request from the Contractor, if payment is not made by the due date and the conditions listed in subdivisions (a)(3)(i) through (a)(3)(ii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday when Federal Government offices are closed and Government business is not expected to be conducted, payment may be made on the following business day without incurring a late payment interest

penalty.

- (i) A proper invoice was received by the designated billing office.
- (ii) A receiving report or other Government documentation authorizing payment was processed and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.
- (iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.
- (4) Computing penalty amount. The interest penalty shall be at the rate established by the Secretary of the Treasury under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) that is in effect on the day after the due date, except where the interest penalty is prescribed by other governmental authority (e.g., tariffs). This rate is referred to as the "Renegotiation Board Interest Rate," and it is published in the Federal Register semiannually on or about January 1 and July 1. The interest penalty shall accrue daily on the invoice principal payment amount approved by the Government until the payment date of such approved principal amount; and will be compounded in 30-day increments inclusive from the first day after the due date through the payment date. That is, interest accrued at the end of any 30-day period will be added to the approved invoice principal payment amount and will be subject to interest penalties if not paid in the succeeding 30-day period. If the designated billing office failed to notify the Contractor of a defective invoice within the periods prescribed in subparagraph (a)(2) of this clause, the due date on the corrected invoice will be adjusted by subtracting from such date the number of days taken beyond the prescribed notification of defects period. Any interest penalty owed the Contractor will be based on this adjusted due date. Adjustments will be made by the designated payment office for errors in calculating interest penalties.
- (i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in subdivision (a)(1)(ii) of this clause, Government acceptance or approval shall be deemed to have occurred constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. In the event that actual acceptance or approval occurs within the constructive acceptance or approval period, the determination of an interest penalty shall be based on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.
- (ii) The following periods of time will not be included in the determination of an interest penalty:
- (A) The period taken to notify the Contractor of defects in invoices submitted to the Government, but this may not exceed 7 days.
- (B) The period between the defects notice and resubmission of the corrected invoice by the Contractor.
- (C) For incorrect electronic funds transfer (EFT) information, in accordance with the EFT clause of this contract.
- (iii) Interest penalties will not continue to accrue after the filing of a claim for such penalties under the clause at 52.233-1, Disputes, or for more than 1 year. Interest penalties of less than \$1 need not be paid.
- (iv) Interest penalties are not required on payment delays due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. Claims involving disputes, and any interest that may be payable, will be resolved in accordance with the clause at 52.233-1, Disputes.
- (5) Prompt payment discounts. An interest penalty also shall be paid automatically by the designated payment office, without request from the Contractor, if a discount for prompt payment is taken improperly. The interest penalty will be calculated on the amount of discount taken for the period beginning with the first day after the end of

the discount period through the date when the Contractor is paid.

- (6) Additional interest penalty. (i) If this contract was awarded on or after October 1, 1989, a penalty amount, calculated in accordance with subdivision (a)(6)(iii) of this clause, shall be paid in addition to the interest penalty amount if the Contractor--
- (A) Is owed an interest penalty of \$1 or more;
- (B) Is not paid the interest penalty within 10 days after the date the invoice amount is paid; and
- (C) Makes a written demand to the designated payment office for additional penalty payment, in accordance with subdivision (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.
- (ii)(A) Contractors shall support written demands for additional penalty payments with the following data. No additional data shall be required. Contractors shall--
- (1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;
- (2) Attach a copy of the invoice on which the unpaid late payment interest was due; and
- (3) State that payment of the principal has been received, including the date of receipt.
- (B) Demands must be postmarked on or before the 40th day after payment was made, except that-
- (1) If the postmark is illegible or nonexistent, the demand must have been received and annotated with the date of receipt by the designated payment office on or before the 40th day after payment was made; or
- (2) If the postmark is illegible or nonexistent and the designated payment office fails to make the required annotation, the demand's validity will be determined by the date the Contractor has placed on the demand; provided such date is no later than the 40th day after payment was made.
- (iii)(A) The additional penalty shall be equal to 100 percent of any original late payment interest penalty, except-
- (1) The additional penalty shall not exceed \$5,000;
- (2) The additional penalty shall never be less than \$25; and
- (3) No additional penalty is owed if the amount of the underlying interest penalty is less than \$1.
- (B) If the interest penalty ceases to accrue in accordance with the limits stated in subdivision (a)(4)(iii) of this clause, the amount of the additional penalty shall be calculated on the amount of interest penalty that would have accrued in the absence of these limits, subject to the overall limits on the additional penalty specified in subdivision (a)(6)(iii)(A) of this clause.
- (C) For determining the maximum and minimum additional penalties, the test shall be the interest penalty due on each separate payment made for each separate contract. The maximum and minimum additional penalty shall not be based upon individual invoices unless the invoices are paid separately. Where payments are consolidated for disbursing purposes, the maximum and minimum additional penalty determination shall be made separately for each contract therein.
- (D) The additional penalty does not apply to payments regulated by other Government regulations (e.g., payments under utility contracts subject to tariffs and regulation).
- (b) Contract financing payments. (1) Due dates for recurring financing payments. If this contract provides for

contract financing, requests for payment shall be submitted to the designated billing office as specified in this contract or as directed by the Contracting Officer. Contract financing payments shall be made on the [insert day as prescribed by Agency head; if not prescribed, insert 30th day] day after receipt of a proper contract financing request by the designated billing office. In the event that an audit or other review of a specific financing request is required to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the due date specified.

- (2) Due dates for other contract financing. For advance payments, loans, or other arrangements that do not involve recurring submissions of contract financing requests, payment shall be made in accordance with the corresponding contract terms or as directed by the Contracting Officer.
- (3) Interest penalty not applicable. Contract financing payments shall not be assessed an interest penalty for payment delays.
- (c) Subcontract clause requirements. The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:
- (1) Prompt payment for subcontractors. A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.
- (2) Interest for subcontractors. An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause--
- (i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and
- (ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.
- (3) Subcontractor clause flowdown. A clause requiring each subcontractor to include a payment clause and an interest penalty clause conforming to the standards set forth in subparagraphs (c)(1) and (c)(2) of this clause in each of its subcontracts, and to require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.
- (d) Subcontract clause interpretation. The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that--
- (1) Retainage permitted. Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;
- (2) Withholding permitted. Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and
- (3) Withholding requirements. Permit such withholding without incurring any obligation to pay a late payment penalty if--
- (i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

- (ii) A copy of any notice issued by a Contractor pursuant to subdivision (d)(3)(i) of this clause has been furnished to the Contracting Officer.
- (e) Subcontractor withholding procedures. If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall--
- (1) Subcontractor notice. Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;
- (2) Contracting Officer notice. Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to subparagraph (e)(1) of this clause;
- (3) Subcontractor progress payment reduction. Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under subparagraph (e)(1) of this clause;
- (4) Subsequent subcontractor payment. Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and--
- (i) Make such payment within--
- (A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under subdivision (e)(5)(i)) of this clause; or
- (B) Seven days after the Contractor recovers such funds from the Government; or
- (ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;
- (5) Notice to Contracting Officer. Notify the Contracting Officer upon--
- (i) Reduction of the amount of any subsequent certified application for payment; or
- (ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying-
- (A) The amounts withheld under subparagraph (e)(1) of this clause; and
- (B) The dates that such withholding began and ended; and
- (6) Interest to Government. Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until--
- (i) The day the identified subcontractor performance deficiency is corrected; or
- (ii) The date that any subsequent payment is reduced under subdivision (e)(5)(i) of this clause.
- (f) Third-party deficiency reports. (1) Withholding from subcontractor. If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for

which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under subparagraph (e)(6) of this clause--

- (i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and
- (ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under subdivision (f)(1)(i) of this clause.
- (2) Subsequent payment or interest charge. As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall--
- (i) Pay the amount withheld under subdivision (f)(1)(ii) of this clause to such first-tier subcontractor; or
- (ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.
- (g) Written notice of subcontractor withholding. A written notice of any withholding shall be issued to a subcontractor (with a copy to the Contracting Officer of any such notice issued by the Contractor), specifying--
- (1) The amount to be withheld;
- (2) The specific causes for the withholding under the terms of the subcontract; and
- (3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.
- (h) Subcontractor payment entitlement. The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.
- (i) Prime-subcontractor disputes. A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the United States is a party. The United States may not be interpleaded in any judicial or administrative proceeding involving such a dispute.
- (j) Preservation of prime-subcontractor rights. Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.
- (k) Non-recourse for prime contractor interest penalty. The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the United States for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER—CENTRAL CONTRACTOR REGISTRATION (MAY 1999)

- (a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.
- (2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either-
- (i) Accept payment by check or some other mutually agreeable method of payment; or
- (ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).
- (b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.
- (c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.
- (d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.
- (e) Contractor EFT arrangements. If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.
- (f) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--
- (i) Making a correct payment;
- (ii) Paying any prompt payment penalty due; and
- (iii) Recovering any erroneously directed funds.
- (2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--
- (i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or
- (ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

- (g) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.
- (h) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.
- (i) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.
- (j) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of Clause)

52.232-35 DESIGNATION OF OFFICE FOR GOVERNMENT RECEIPT OF ELECTRONIC FUNDS TRANSFER INFORMATION (MAY 1999)

- (a) As provided in paragraph (b) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration, the Government has designated the office cited in paragraph (c) of this clause as the office to receive the Contractor's electronic funds transfer (EFT) information, in lieu of the payment office of this contract.
- (b) The Contractor shall send all EFT information, and any changes to EFT information to the office designated in paragraph (c) of this clause. The Contractor shall not send EFT information to the payment office, or any other office than that designated in paragraph (c). The Government need not use any EFT information sent to any office other than that designated in paragraph (c).
- (c) Designated Office:

Mailing Address:

U.S. Army Corps of Engineers St. Paul District 190 East Fifth Street St. Paul, MN 55101-1638

Telephone Number:

651/290-5233

Person to Contact:

Mr. Wayne Scheffel, CEMVP-RM-F

Electronic Address:

wayne.scheffel@usace.army.mil

(End of clause)

52.233-1 DISPUTES. (DEC 1998)

- (a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).
- (b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.
- (c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.
- (d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.
- (2)(i) The contractors shall provide the certification specified in subparagraph (d)(2)(iii) of this clause when submitting any claim -
- (A) Exceeding \$100,000; or
- (B) Regardless of the amount claimed, when using -
- (1) Arbitration conducted pursuant to 5 U.S.C. 575-580; or
- (2) Any other alternative means of dispute resolution (ADR) technique that the agency elects to handle in accordance with the Administrative Dispute Resolution Act (ADRA).
- (ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.
- (iii) The certification shall state as follows: "I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor.

- (3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.
- (e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.
- (f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.
- (g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use alternative disput resolution (ADR). If the Contractor refuses an offer for ADR, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the request.
- (h) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.
- (i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

(End of clause)

52.233-3 **PROTEST AFTER AWARD (AUG. 1996)**

- (a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--
- (1) Cancel the stop-work order; or
- (2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.
- (b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be modified, in writing, accordingly, if--
- (1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and
- (2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and

act upon a proposal at any time before final payment under this contract.

- (c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.
- (d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.
- (e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.
- (f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least Twenty (20) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

- (a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of
- (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or
- (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.
- (b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.
- (c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.
- (d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

- (a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to
- (1) conditions bearing upon transportation, disposal, handling, and storage of materials;
- (2) the availability of labor, water, electric power, and roads;
- (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.
- (b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

- (a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by results of surveys, soil borings and soil testing (both in the fields and in the laboratory) noted on the boring logs, record drawings, photograph and site visits. Graphic logs of borings located within the area of work under this contract are shown on the drawings. The borings are representative of subsurface conditions at their respective locations and for their respective reaches. Variations in the stratigraphy and characteristics of the soil and rock are known to occur between borings. Normal variations in site geology will not be considered as differing materially within the purview of Contract Clause FAR 52.236-3, Differing Site Conditions. Ground water elevations measured in borings are not constant and will fluctuate.
- (b) Weather conditions: Before submitting a bid, bidders should satisfy themselves as to the potential hazards from weather conditions. Complete weather records and reports may be obtained from the local US Weather Service.
- (c) Transportation facilities: Before Submitting a bid bidder should obtain necessary data as to access of highway and railroad facilities. The unavailability of transportation facilities shall not become a basis for claims for damages or time extensions to complete the work.
- (d) River Conditions: Hydrographs of the river stages are indicated on the drawings. These hydrographs include

historic water levels and/or flows at the gauging stations. The contractor has the responsibility to schedule its operations to take advantage the most favorable river stages.

52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)

- (a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.
- (b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.
- (c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the worksite a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

52.236-8 OTHER CONTRACTS (APR 1984)

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

- (a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer
- (b) The Contractor shall protect from damage all existing improvements and utilities
- (1) at or near the work site, and
- (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)

- (a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- (b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- (c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation.

When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)

- (a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.
- (b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

52.236-12 CLEANING UP (APR 1984)

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

52.236-13 ACCIDENT PREVENTION (NOV 1991) – ALTERNATE I (NOV 1991)

- (a) The Contractor shall provide and maintain work environments and procedures which will
- (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities;
- (2) avoid interruptions of Government operations and delays in project completion dates; and
- (3) control costs in the performance of this contract.
- (b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall-
- (1) Provide appropriate safety barricades, signs, and signal lights;
- (2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and
- (3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the

purposes are taken.

- (c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.
- (d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.
- (e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.
- (f) Before commencing the work, the Contractor shall-
- (1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; and
- (2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

- (a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.
- (b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- (c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with

sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

52.236-16 QUANTITY SURVEYS (APR 1984) - ALTERNATE I (APR 1984)

- (a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.
- (b) The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.
- (c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The

Contractor shall retain copies of all such material furnished to the Contracting Officer.

52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without

such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

- (b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by," or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.
- (c) Where "as shown," as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".
- (d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.
- (f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.
- (g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

52.242-13 BANKRUPTCY (JUL 1995)

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

(End of clause)

52.242-14 SUSPENSION OF WORK (APR 1984)

- (a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract. (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

52.243-4 CHANGES (AUG 1987)

- (a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--
- (1) In the specifications (including drawings and designs);
- (2) In the method or manner of performance of the work;
- (3) In the Government-furnished facilities, equipment, materials, services, or site; or

- (4) Directing acceleration in the performance of the work.
- (b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating
- (1) the date, circumstances, and source of the order and
- (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after
- (1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.
- (f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

52.244-2 SUBCONTRACTS (AUG 1998)

(a) Definitions. As used in this clause--

Approved purchasing system means a Contractor's purchasing system that has been reviewed and approved in accordance with Part 44 of the Federal Acquisition Regulation (FAR).

Consent to subcontract means the Contracting Officer's written consent for the Contractor to enter into a particular subcontract.

Subcontract means any contract, as defined in FAR Subpart 2.1, entered into by a subcontractor to furnish supplies or services for performance of the prime contract or a subcontract. It includes, but is not limited to, purchase orders, and changes and modifications to purchase orders.

- (b) This clause does not apply to subcontracts for special test equipment when the contract contains the clause at FAR 52.245-18, Special Test Equipment.
- (c) When this clause is included in a fixed-price type contract, consent to subcontract is required only on unpriced contract actions (including unpriced modifications or unpriced delivery orders), and only if required in accordance with paragraph (d) or (e) of this clause.

- (d) If the Contractor does not have an approved purchasing system, consent to subcontract is required for any subcontract that--
- (1) Is of the cost-reimbursement, time-and-materials, or labor-hour type; or
- (2) Is fixed-price and exceeds--
- (i) For a contract awarded by the Department of Defense, the Coast Guard, or the National Aeronautics and Space Administration, the greater of the simplified acquisition threshold or 5 percent of the total estimated cost of the contract; or
- (ii) For a contract awarded by a civilian agency other than the Coast Guard and the National Aeronautics and Space Administration, either the simplified acquisition threshold or 5 percent of the total estimated cost of the contract.
- (e) If the Contractor has an approved purchasing system, the Contractor nevertheless shall obtain the Contracting Officer's written consent before placing the following subcontracts:

NONE

- (f)(1) The Contractor shall notify the Contracting Officer reasonably in advance of placing any subcontract or modification thereof for which consent is required under paragraph (c), (d), or (e) of this clause, including the following information:
- (i) A description of the supplies or services to be subcontracted.
- (ii) Identification of the type of subcontract to be used.
- (iii) Identification of the proposed subcontractor.
- (iv) The proposed subcontract price.
- (v) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions.
- (vi) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract.
- (vii) A negotiation memorandum reflecting--
- (A) The principal elements of the subcontract price negotiations;
- (B) The most significant considerations controlling establishment of initial or revised prices;
- (C) The reason cost or pricing data were or were not required;
- (D) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;
- (E) The extent to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and the subcontractor; and the effect of any such defective data on the total price negotiated;
- (F) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

- (G) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.
- (2) The Contractor is not required to notify the Contracting Officer in advance of entering into any subcontract for which consent is not required under paragraph (c), (d), or (e) of this clause.
- (g) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination--
- (1) Of the acceptability of any subcontract terms or conditions;
- (2) Of the allowability of any cost under this contract; or
- (3) To relieve the Contractor of any responsibility for performing this contract.
- (h) No subcontract or modification thereof placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement type subcontracts shall not exceed the fee limitations in FAR 15.404-4(c)(4)(i).
- (i) The Contractor shall give the Contracting Officer immediate written notice of any action or suit filed and prompt notice of any claim made against the Contractor by any subcontractor or vendor that, in the opinion of the Contractor, may result in litigation related in any way to this contract, with respect to which the Contractor may be entitled to reimbursement from the Government.
- (j) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.
- (k) Paragraphs (d) and (f) of this clause do not apply to the following subcontracts, which were evaluated during negotiations:

NONE

(End of clause)

52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS (DEC 2001)

(a) Definitions. As used this clause--

"Commercial item", has the meaning contained in the clause at 52.202-1, Definitions.

- "Subcontract", includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.
- (b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.
- (c)(1) The Contractor shall insert the following clauses in subcontracts for commercial items:
- (i) 52.219-8, Utilization of Small Business Concerns (OCT 2000) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns)

exceeds \$500,000 (\$1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

- (ii) 52.222-26, Equal Opportunity (FEB 1999) (E.O. 11246).
- (iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era and Other Eligible Veterans (DEC 2001) (38 U.S.C. 4212(a)).
- (iv) 52.222-36, Affirmative Action for Workers with Disabilities (JUN 1998) (29 U.S.C. 793).
- (v) 52.247-64, Preference for Privately Owned U.S.-Flagged Commercial Vessels (JUN 2000) (46 U.S.C. Appx 1241) (flowdown not required for subcontracts awarded beginning May 1, 1996).
- (2) While not required, the Contractor may flow down to subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.
- (d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

52.245-1 PROPERTY RECORDS (APR 1984)

The Government shall maintain the Government's official property records in connection with Government property under this contract. The Government Property clause is hereby modified by deleting the requirement for the Contractor to maintain such records.

52.245-2 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (DEC 1989)

- (a) Government-furnished property. (1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request and is reasonably required for the intended use of the property (hereinafter referred to as "Government-furnished property").
- (2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished "as is") will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract's delivery or performance dates.
- (3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.
- (4) If Government-furnished property is not delivered to the Contractor by the required time, the Contracting Officer shall, upon the Contractor's timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.
- (b) Changes in Government-furnished property. (1) The Contracting Officer may, by written notice, (i) decrease the Government-furnished property provided or to be provided under this contract, or (ii) substitute other Government-furnished property for the property to be provided by the Government, or to be acquired by the Contractor for the

Government, under this contract. The Contractor shall promptly take such action as the Contracting Officer may direct regarding the removal, shipment, or disposal of the property covered by such notice.

- (2) Upon the Contractor's written request, the Contracting Officer shall make an equitable adjustment to the contract in accordance with paragraph (h) of this clause, if the Government has agreed in the Schedule to make the property available for performing this contract and there is any--
- (i) Decrease or substitution in this property pursuant to subparagraph (b)(1) of this clause; or
- (ii) Withdrawal of authority to use this property, if provided under any other contract or lease.
- (c) Title in Government property. (1) The Government shall retain title to all Government-furnished property.
- (2) All Government-furnished property and all property acquired by the Contractor, title to which vests in the Government under this paragraph (collectively referred to as "Government property"), are subject to the provisions of this clause. However, special tooling accountable to this contract is subject to the provisions of the Special Tooling clause and is not subject to the provisions of this clause. Title to Government property shall not be affected by its incorporation into or attachment to any property not owned by the Government, nor shall Government property become a fixture or lose its identity as personal property by being attached to any real property.
- (3) Title to each item of facilities and special test equipment acquired by the Contractor for the Government under this contract shall pass to and vest in the Government when its use in performing this contract commences or when the Government has paid for it, whichever is earlier, whether or not title previously vested in the Government.
- (4) If this contract contains a provision directing the Contractor to purchase material for which the Government will reimburse the Contractor as a direct item of cost under this contract--
- (i) Title to material purchased from a vendor shall pass to and vest in the Government upon the vendor's delivery of such material; and
- (ii) Title to all other material shall pass to and vest in the Government upon--
- (A) Issuance of the material for use in contract performance;
- (B) Commencement of processing of the material or its use in contract performance; or
- (C) Reimbursement of the cost of the material by the Government, whichever occurs first.
- (d) Use of Government property. The Government property shall be used only for performing this contract, unless otherwise provided in this contract or approved by the Contracting Officer.
- (e) Property administration. (1) The Contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with Federal Acquisition Regulation (FAR) Subpart 45.5, as in effect on the date of this contract.
- (2) The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Government property in accordance with sound industrial practice and the applicable provisions of Subpart 45.5 of the FAR.
- (3) If damage occurs to Government property, the risk of which has been assumed by the Government under this contract, the Government shall replace the items or the Contractor shall make such repairs as the Government directs. However, if the Contractor cannot effect such repairs within the time required, the Contractor shall dispose of the property as directed by the Contracting Officer. When any property for which the Government is responsible is replaced or repaired, the Contracting Officer shall make an equitable adjustment in accordance with paragraph (h) of this clause.

- (4) The Contractor represents that the contract price does not include any amount for repairs or replacement for which the Government is responsible. Repair or replacement of property for which the Contractor is responsible shall be accomplished by the Contractor at its own expense.
- (f) Access. The Government and all its designees shall have access at all reasonable times to the premises in which any Government property is located for the purpose of inspecting the Government property.
- (g) Risk of loss. Unless otherwise provided in this contract, the Contractor assumes the risk of, and shall be responsible for, any loss or destruction of, or damage to, Government property upon its delivery to the Contractor or upon passage of title to the Government under paragraph (c) of this clause. However, the Contractor is not responsible for reasonable wear and tear to Government property or for Government property properly consumed in performing this contract.
- (h) Equitable adjustment. When this clause specifies an equitable adjustment, it shall be made to any affected contract provision in accordance with the procedures of the Changes clause. When appropriate, the Contracting Officer may initiate an equitable adjustment in favor of the Government. The right to an equitable adjustment shall be the Contractor's exclusive remedy. The Government shall not be liable to suit for breach of contract for--
- (1) Any delay in delivery of Government-furnished property;
- (2) Delivery of Government-furnished property in a condition not suitable for its intended use;
- (3) A decrease in or substitution of Government-furnished property; or
- (4) Failure to repair or replace Government property for which the Government is responsible.
- (i) Final accounting and disposition of Government property. Upon completing this contract, or at such earlier dates as may be fixed by the Contracting Officer, the Contractor shall submit, in a form acceptable to the Contracting Officer, inventory schedules covering all items of Government property (including any resulting scrap) not consumed in performing this contract or delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as the Contracting Officer directs.
- (j) Abandonment and restoration of Contractor's premises. Unless otherwise provided herein, the Government--
- (1) May abandon any Government property in place, at which time all obligations of the Government regarding such abandoned property shall cease; and
- (2) Has no obligation to restore or rehabilitate the Contractor's premises under any circumstances (e.g., abandonment, disposition upon completion of need, or upon contract completion). However, if the Government-furnished property (listed in the Schedule or specifications) is withdrawn or is unsuitable for the intended use, or if other Government property is substituted, then the equitable adjustment under paragraph (h) of this clause may properly include restoration or rehabilitation costs.
- (k) Communications. All communications under this clause shall be in writing.
- (l) Overseas contracts. If this contract is to be performed outside of the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively. (End of clause)

52.245-3 Identification of Government Furnished Property

- (a) The Contractor is required to accept delivery, load and unload and transport the property to the job site at its own expense. When the property is delivered, the Contractor shall verify its quantity and condition and acknowledge receipt in writing to the Contracting Officer. The Contractor shall also report in writing to the Contracting Officer within 24 hours of delivery any damage to or shortage of the property as received. All such property shall be installed or incorporated into the work at the expense of the Contractor, unless otherwise indicated in this contract.
- (b) Each item of property to be furnished under this clause shall be identified in the Schedule by quantity, item, and description.

(end of clause)

52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996)

- (a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.
- (b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:
- (1) Stop work as specified in the notice.
- (2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.
- (3) Terminate all subcontracts to the extent they relate to the work terminated.
- (4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.
- (5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.
- (6) As directed by the Contracting Officer, transfer title and deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.
- (7) Complete performance of the work not terminated.
- (8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.
- (9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b)(6) of this clause; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made

by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

- (c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 120-day period.
- (d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.
- (e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1-year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.
- (f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid or remaining to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (g) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be modified, and the Contractor paid the agreed amount. Paragraph (g) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.
- (g) If the Contractor and the Contracting Officer fail to agree on the whole amount to be paid because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined by the Contracting Officer as follows, but without duplication of any amounts agreed on under paragraph (f) of this clause:
- (1) The contract price for completed supplies or services accepted by the Government (or sold or acquired under subparagraph (b)(9) of this clause) not previously paid for, adjusted for any saving of freight and other charges.
- (2) The total of--
- (i) The costs incurred in the performance of the work terminated, including initial costs and preparatory expense allocable thereto, but excluding any costs attributable to supplies or services paid or to be paid under subparagraph (f)(1) of this clause;
- (ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(2)(i) of this clause; and
- (iii) A sum, as profit on subdivision (g)(2)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss
- (3) The reasonable costs of settlement of the work terminated, including--

- (i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;
- (ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and
- (iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.
- (h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.
- (i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.
- (j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to submit the termination settlement proposal or request for equitable adjustment within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.
- (k) In arriving at the amount due the Contractor under this clause, there shall be deducted-
- (1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;
- (2) Any claim which the Government has against the Contractor under this contract; and
- (3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.
- (l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.
- (m)(1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.
- (2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.
- (n) Unless otherwise provided in this contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

- (a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.
- (b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if--
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include
- (i) acts of God or of the public enemy,
- (ii) acts of the Government in either its sovereign or contractual capacity,
- (iii) acts of another Contractor in the performance of a contract with the Government,
- (iv) fires,
- (v) floods,
- (vi) epidemics,
- (vii) quarantine restrictions,
- (viii) strikes,
- (ix) freight embargoes,
- (x) unusually severe weather, or delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
- (2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far

52.253-1 COMPUTER GENERATED FORMS (JAN 1991)

- (a) Any data required to be submitted on a Standard or Optional Form prescribed by the Federal Acquisition Regulation (FAR) may be submitted on a computer generated version of the form, provided there is no change to the name, content, or sequence of the data elements on the form, and provided the form carries the Standard or Optional Form number and edition date.
- (b) Unless prohibited by agency regulations, any data required to be submitted on an agency unique form prescribed by an agency supplement to the FAR may be submitted on a computer generated version of the form provided there is no change to the name, content, or sequence of the data elements on the form and provided the form carries the agency form number and edition date.
- (c) If the Contractor submits a computer generated version of a form that is different than the required form, then the rights and obligations of the parties will be determined based on the content of the required form.

252.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

- (a) "Definition. Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the contracting officer to perform specific technical or administrative functions.
- (b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the contracting officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

252.203-7001 PROHIBITION ON PERSONS CONVICTED OF FRAUD OR OTHER DEFENSE-CONTRACT-RELATED FELONIES (MAR 1999)

- (a) Definitions. As used in this clause—
- (1) "Arising out of a contract with the DoD" means any act in connection with—
- (i) Attempting to obtain;
- (ii) Obtaining, or
- (iii) Performing a contract or first-tier subcontract of any agency, department, or component of the Department of Defense (DoD).
- (2) "Conviction of fraud or any other felony" means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of *nolo contendere*, for which sentence has been imposed.
- (3) "Date of conviction" means the date judgment was entered against the individual.
- (b) Any individual who is convicted after September 29, 1988, of fraud or any other felony arising out of a contract with the DoD is prohibited from serving--
- (1) In a management or supervisory capacity on any DoD contract or first-tier subcontract;
- (2) On the board of directors of any DoD contractor or first-tier subcontractor;
- (3) As a consultant, agent, or representative for any DoD contractor or first-tier subcontractor; or
- (4) In any other capacity with the authority to influence, advise, or control the decisions of any DoD contractor or subcontractor with regard to any DoD contract or first-tier subcontract.
- (c) Unless waived, the prohibition in paragraph (b) of this clause applies for not less than 5 years from the date of conviction.
- (d) 10 U.S.C. 2408 provides that a defense contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than \$500,000 if convicted of knowingly—
- (1) Employing a person under a prohibition specified in paragraph (b) of this clause; or
- (2) Allowing such a person to serve on the board of directors of the contractor or first-tier subcontractor.
- (e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as—
- (1) Suspension or debarment;
- (2) Cancellation of the contract at no cost to the Government; or
- (3) Termination of the contract for default.
- (f) The Contractor may submit written requests for waiver of the prohibition in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify—
- (1) The person involved;

- (2) The nature of the conviction and resultant sentence or punishment imposed;
- (3) The reasons for the requested waiver; and
- (4) An explanation of why a waiver is in the interest of national security.
- (g) The Contractor agrees to include the substance of this clause, appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.
- (h) Pursuant to 10 U.S.C. 2408(c), defense contractors and subcontractors may obtain information as to whether a particular person has been convicted of fraud or any other felony arising out of a contract with the DoD by contacting The Office of Justice Programs, The Denial of Federal Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

(End of clause)

252.203-7002 DISPLAY OF DOD HOTLINE POSTER (DEC 1991)

- (a) The Contractor shall display prominently in common work areas within business segments performing work under Department of Defense (DoD) contracts, DoD Hotline Posters prepared by the DoD Office of the Inspector General.
- (b) DoD Hotline Posters may be obtained from the DoD Inspector General, ATTN: Defense Hotline, 400 Army Navy Drive, Washington, DC 22202-2884.
- (c) The Contractor need not comply with paragraph (a) of this clause if it has established a mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports.

(End of clause)

252.204-7003 CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992)

The Contractor's procedures for protecting against unauthorized disclosure of information shall not require Department of Defense employees or members of the Armed Forces to relinquish control of their work products, whether classified or not, to the contractor.

(End of clause)

252.204-7004 REQUIRED CENTRAL CONTRACTOR REGISTRATION.(NOV 2001)

(a) Definitions.

As used in this clause--

- (1) Central Contractor Registration (CCR) database means the primary DoD repository for contractor information required for the conduct of business with DoD.
- (2) Data Universal Numbering System (DUNS) number means the 9-digit number assigned by Dun and Bradstreet Information Services to identify unique business entities.
- (3) Data Universal Numbering System +4 (DUNS+4) number means the DUNS number assigned by Dun and Bradstreet plus a 4-digit suffix that may be assigned by a parent (controlling) business concern. This 4-digit suffix may be assigned at the discretion of the parent business concern for such purposes as identifying subunits or affiliates of the parent business concern.
- (4) Registered in the CCR database means that all mandatory information, including the DUNS number or the DUNS+4 number, if applicable, and the corresponding Commercial and Government Entity (CAGE) code, is in the CCR database; the DUNS number and the CAGE code have been validated; and all edits have been successfully completed.
- (b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee must be registered in the CCR database prior to award, during performance, and through final payment of any contract resulting from this solicitation, except for awards to foreign vendors for work to be performed outside the United States
- (2) The offeror shall provide its DUNS or, if applicable, its DUNS+4 number with its offer, which will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.
- (3) Lack of registration in the CCR database will make an offeror ineligible for award.
- (4) DoD has established a goal of registering an applicant in the CCR database within 48 hours after receipt of a complete and accurate application via the Internet. However, registration of an applicant submitting an application through a method other than the Internet may take up to 30 days. Therefore, offerors that are not registered should consider applying for registration immediately upon receipt of this solicitation.
- (c) The Contractor is responsible for the accuracy and completeness of the data within the CCR, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to confirm on an annual basis that its information in the CCR database is accurate and complete.
- (d) Offerors and contractors may obtain information on registration and annual confirmation requirements by calling 1-888-227-2423, or via the Internet at http://www.ccr.com.

(End of clause)

252.205-7000 PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS (DEC 1991)

(a) Definition.

"Cooperative agreement holder" means a State or local government; a private, nonprofit organization; a tribal organization (as defined in section 4(c) of the Indian Self-Determination and Education Assistance Act (Pub. L. 93-268; 25 U.S.C. 450 (c))); or an economic enterprise (as defined in section 3(e) of the Indian Financing Act of 1974 (Pub. L. 93-362; 25 U.S.C. 1452(e))) whether such economic enterprise is organized for profit or nonprofit

purposes; which has an agreement with the Defense Logistics Agency to furnish procurement technical assistance to business entities.

- (b) The Contractor shall provide cooperative agreement holders, upon their request, with a list of those appropriate employees or offices responsible for entering into subcontracts under defense contracts. The list shall include the business address, telephone number, and area of responsibility of each employee or office.
- (c) The Contractor need not provide the listing to a particular cooperative agreement holder more frequently than once a year.

(End of clause)

252.209-7003 COMPLIANCE WITH VETERANS' EMPLOYMENT REPORTING REQUIREMENTS (MAR 1998)

By submission of its offer, the offeror represents that, if it is subject to the reporting requirements of 37 U.S.C. 4212(d) (i.e., the VETS-100 report required by Federal Acquisition Regulation clause 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era), it has submitted the most recent report required by 38 U.S.C. 4212(d).

252.209-7004 SUBCONTRACTING WITH FIRMS THAT ARE OWNED OR CONTROLLED BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

- (a) Unless the Government determines that there is a compelling reason to do so, the Contractor shall not enter into any subcontract in excess of \$25,000 with a firm, or subsidiary of a firm, that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country.
- (b) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country. The notice must include the name of the proposed subcontractor notwithstanding its inclusion on the List of Parties Excluded From Federal Procurement and Nonprocurement Programs.

252.219-7003 SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DOD CONTRACTS) (APR. 1996)

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.

(a) *Definitions. Historically black colleges and universities*, as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

Minority institutions, as used in this clause, means institutions meeting the requirements of section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).

- (b) Except for company or division-wide commercial items subcontracting plans, the term *small disadvantaged business*, when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions, in addition to small disadvantaged business concerns.
- (c) Work under the contract or its subcontracts shall be credited toward meeting the small disadvantaged business concern goal required by paragraph (d) of the FAR 52.219-9 clause when:
- (1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and
- (2) It meets the requirements of 10 U.S.C. 2323a.
- (d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.
- (e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--
- (f) The master plan approval referred to in paragraph (f) of the FAR 52.219-9 clause is approval by the Contractor's cognizant contract administration activity.
- (g) In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned small businesses, the Contractor shall notify the Administrative Contracting Officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable.

(End of clause)

252.223-7006 PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND HAZARDOUS MATERIALS (APR 1993)

(a) "Definitions".

As used in this clause --

- (1) "Storage" means a non-transitory, semi-permanent or permanent holding, placement, or leaving of material. It does not include a temporary accumulation of a limited quantity of a material used in or a waste generated or resulting from authorized activities, such as servicing, maintenance, or repair of Department of Defense (DoD) items, equipment, or facilities.
- (2) "Toxic or hazardous materials" means:
- (i) Materials referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601(14)) and materials designated under section 102 of CERCLA (42 U.S.C. 9602) (40 CFR part 302);
- (ii) Materials that are of an explosive, flammable, or pyrotechnic nature; or

- (iii) Materials otherwise identified by the Secretary of Defense as specified in DoD regulations.
- (b) In accordance with 10 U.S.C. 2692, the Contractor is prohibited from storing or disposing of non-DoD-owned toxic or hazardous materials on a DoD installation, except to the extent authorized by a statutory exception to 10 U.S.C. 2692 or as authorized by the Secretary of Defense or his designee.

(End of clause)

252.225-7012 PREFERENCE FOR CERTAIN DOMESTIC COMMODITIES (AUG 2000)

- (a) The Contractor agrees to deliver under this contract only such of the following articles that have been grown, reprocessed, reused, or produced in the United States, its possessions, or Puerto Rico --
- (1) Food;
- (2) Clothing;
- (3) Tents, tarpaulins, or covers;
- (4) Cotton and other natural fiber products;
- (5) Woven silk or woven silk blends:
- (6) Spun silk yarn for cartridge cloth;
- (7) Synthetic fabric, and coated synthetic fabric, including all textile fibers and yarns that are for use in such fabrics;
- (8) Canvas products;
- (9) Wool (whether in the form of fiber or yarn or contained in fabrics, materials, or manufactured articles); or
- (10) Any item of individual equipment (Federal supply Classification 8465) manufactured from or containing such fibers, yarns, fabrics, or materials.
- (b) This clause does not apply --
- (1) To supplies listed in FAR section 25.104(a), or other supplies for which the Government has determined that a satisfactory quality and sufficient quantity cannot be acquired as and when needed at U.S. market prices;
- (2) To foods which have been manufactured or processed in the United States, its possessions, or Puerto Rico;
- (3) To chemical warfare protective clothing produced in the countries listed in subsection 225.872-1 of the Defense FAR Supplement; or
- (4) To fibers and yarns that are for use in synthetic fabric or coated synthetic fabric (but does apply to the synthetic or coated synthetic fabric itself), if--
- (i) The fabric is to be used as a component of an end item that is not a textile product. Examples of textile products, made in whole or in part of fabric, include--
- (a) Draperies, floor coverings, furnishings, and bedding (Federal Supply Group 72, Household and Commercial Furnishings and Appliances);

- (B) Items made in whole or in part of fabric in Federal Supply Group 83, Textile/leather/furs/apparel/findings/tents/flags, or Federal Supply Group 84, Clothing, Individual Equipment and Insignia;
- (C) Upholstered seats (whether for household, office, or other use); and
- (D) Parachutes (Federal Supply Class 1670); or
- (ii) The fibers and yarns are para-aramid fibers and yarns manufactured in the Netherlands.

(End of clause)

252.225-7031 SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992)

- (a) Definitions. As used in this clause--
- (1) "Foreign person" means any person other than a United States person as defined in Section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec 2415).
- (2) "United States person" is defined in Section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concerns, as determined under regulations of the President.
- (b) Certification. By submitting this offer, the Offeror, if a foreign person, company or entity, certifies that it-
- (1) Does not comply with the Secondary Arab Boycott of Israel; and
- (2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec 2407(a) prohibits a United States person from taking.

(End of clause)

252.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)

- (a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)

When the allowability of costs under this contract is determined in accordance with part 31 of the Federal Acquisition Regulation (FAR), allowability shall also be determined in accordance with part 231 of the Defense FAR Supplement, in effect on the date of this contract.

252.236-7000 MODIFICATION PROPOSALS - PRICE BREAKDOWN. (DEC 1991)

- (a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.
- (b) The price breakdown --
- (1) Must include sufficient detail to permit an analysis of profit, and of all costs for --
- (i) Material;
- (ii) Labor;
- (iii) Equipment;
- (iv) Subcontracts; and
- (v) Overhead; and
- (2) Must cover all work involved in the modification, whether the work was deleted, added, or changed.
- (c) The Contractor shall provide similar price breakdowns to support any amounts claimed for subcontracts.
- (d) The Contractor's proposal shall include a justification for any time extension proposed.

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000)

- (a) The Government will provide to the Contractor, without charge, one set (on a CD) of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.
- (b) The Contractor shall--
- (1) Check all drawings furnished immediately upon receipt;
- (2) Compare all drawings and verify the figures before laying out the work;
- (3) Promptly notify the Contracting Officer of any discrepancies;
- (4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and
- (5) Reproduce and print contract drawings and specifications as needed.

- (c) In general--
- (1) Large-scale drawings shall govern small-scale drawings; and
- (2) The Contractor shall follow figures marked on drawings in preference to scale measurements.
- (d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.
- (e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

Title File Drawing No.

See Drawings, Sheet Title "List of Drawings"

252.236-7008 CONTRACT PRICES - BIDDING SCHEDULES. (DEC 1991)

- (a) The Government's payment for the items listed in the Bidding Schedule shall constitute full compensation to the Contractor for --
- (1) Furnishing all plant, labor, equipment, appliances, and materials; and
- (2) Performing all operations required to complete the work in conformity with the drawings and specifications.
- (b) The Contractor shall include in the prices for the items listed in the Bidding Schedule all costs for work in the specifications, whether or not specifically listed in the Bidding Schedule.

252.242-7000 POSTAWARD CONFERENCE (DEC 1991)

The Contractor agrees to attend any postaward conference convened by the contracting activity or contract administration office in accordance with Federal Acquisition Regulation subpart 42.5.

(End of clause)

252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR part 31 and DFARS part 231, in effect on the date of this contract, apply.

252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)

- (a) The amount of any request for equitable adjustment to contract terms shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.
- (b) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:

I certify that the reques	st is made in good faith	n, and that the support	ing data are accurate	e and complete to	the best of
my knowledge and bel	ief.				

(Official's Name)	 	
 (Title)	 	

- (c) The certification in paragraph (b) of this clause requires full disclosure of all relevant facts, including--
- (1) Cost or pricing data if required in accordance with subsection 15.403-4 of the Federal Acquisition Regulation (FAR); and
- (2) Information other than cost or pricing data, in accordance with subsection 15.403-3 of the FAR, including actual cost data and data to support any estimated costs, even if cost or pricing data are not required.
- (d) The certification requirement in paragraph (b) of this clause does not apply to----
- (1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or
- (2) Final adjustment under an incentive provision of the contract.

252.246-7000 MATERIAL INSPECTION AND RECEIVING REPORT (DEC 1991)

At the time of each delivery of supplies or services under this contract, the Contractor shall prepare and furnish to the Government a Material Inspection and Receiving Report in the manner and to the extent required by Appendix F, Material Inspection and Receiving Report, of the Defense FAR Supplement.

(End of clause)

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

- (a) Definitions. As used in this clause --
- (1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of

manufacture, fabrication, or assembly by the Contractor or any subcontractor.

- (2) "Department of Defense" (DoD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.
- (3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.
- (4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through international waters.
- (5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.
- (6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.
- (i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.
- (ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.
- (7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.
- (b)(1) The Contractor shall use U.S.-flag vessels when transporting any supplies by sea under this contract.
- (2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessels if--
- (i) This contract is a construction contract; or
- (ii) The supplies being transported are--
- (A) Noncommercial items; or
- (B) Commercial items that--
- (1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it contracts for f.o.b. destination shipment);
- (2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or
- (3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.
- (c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that --
- (1) U.S.-flag vessels are not available for timely shipment;
- (2) The freight charges are inordinately excessive or unreasonable; or
- (3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.Sflag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum
(1) Type, weight, and cube of cargo;
(2) Required shipping date;
(3) Special handling and discharge requirements;
(4) Loading and discharge points;
(5) Name of shipper and consignee;
(6) Prime contract number; and
(7) A documented description of efforts made to secure U.Sflag vessels, including points of contact (with names and telephone numbers) with at least two U.Sflag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.
(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information
(1) Prime contract number;
(2) Name of vessel;
(3) Vessel flag of registry;
(4) Date of loading;
(5) Port of loading;
(6) Port of final discharge;
(7) Description of commodity;
(8) Gross weight in pounds and cubic feet if available;
(9) Total ocean freight in U.S. dollars; and
(10) Name of the steamship company.
(f) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief

(2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;

(1) No ocean transportation was used in the performance of this contract;

- (3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or
- (4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format:

ITEM DESCRIPTION	CONTRACT LINE ITEMS	QUANTITY
ГОТАL		

- (g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.
- (h) The Contractor shall include this clause, including this paragraph (h), in all subcontractors under this contract that--
- (1) Exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation; and
- (2) Are for a type of supplies described in paragraph (b)(3) of this clause.

(End of clause)

252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

- (a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor --
- (1) Shall notify the Contracting Officer of that fact; and
- (2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.
- (b) The Contractor shall include this clause; including this paragraph (b), revised as necessary to reflect the relationship of the contracting parties--
- (1) In all subcontracts under this contract, if this contract is a construction contract; or
- (2) If this contract is not a construction contract, in all subcontracts under this contract that are for-
- (i) Noncommercial items; or
- (ii) Commercial items that--

- (A) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);
- (B) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or
- (C) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(End of clause)

252.248-7000 PREPARATION OF VALUE ENGINEERING CHANGE PROPOSALS (MAY 1994)

Prepare value engineering change proposals, for submission pursuant to the value engineering clause of this contract, in the format prescribed by the version of MIL-STD-973 in effect on the date of contract award.

(End of clause)

SECTION 00800 Special Contract Requirements

CLAUSES INCORPORATED BY FULL TEXT

52.000-4004 *PARTNERING*

The Government proposes to form a partnering relationship with the contractor. This partnering relationship will strive to facilitate communication and draw on the strengths of each organization in an effort to achieve a quality project, within budget, and on schedule. Participation will be totally voluntary. Partnering will not alter or supersede any provision of this contract nor will it provide either party with any additional contractual rights or obligations. Participation in partnering will not affect award of this contract. Any cost associated with this partnering will be agreed to by both parties and will be shared equally, with no change in contract price.

52.212-4003 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (OCT 1989) ER 415-1-15

- a. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSES: DEFAULT (FIXED-PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:
- 1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
- 2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.
- b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY WORKDAYS BASED ON (5) DAY WORKWEEK.

GEOGRAPHIC LOCATION -- East Grand Forks, Minnesota

Month JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Days 20 14 9 3 3 4 4 4 3 2 7 17

c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled workday. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSES: DEFAULT (FIXED-PRICE CONSTRUCTION).

52.212-5000 EVALUATION OF SUBDIVIDED ITEMS (MAR 1995)--EFARS

Item Nos. 13, 14, 15, 73, 74, and 75 are subdivided into two or more estimated quantities and are to be separately priced. The Government will evaluate each of these items on the basis of total price of its sub-items.

(End of provision)

52.212-5001 VARIATIONS IN ESTIMATED QUANTITIES, SUBDIVIDED ITEMS (MAR 1995)--EFARS

This variation in estimated quantities clause is applicable only to Items Nos. 13, 14, 15, 56, 57, 73, 74, and 75.

- (a) Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price.
- (b) Where the actual quantity of work performed for Items Nos. 13, 14, 15, 56, 57, 73, 74 and 75 is less than 85% of the quantity of the first sub-item listed under such item, the contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment shall be made in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.
- (c) If the actual quantity of work performed under Items Nos. 13, 14, 15, 56. 57. 73, 74 and 75 exceeds 115% or is less than 85% of the total estimated quantity of the sub-item under that item and/or if the quantity of the work performed under the second sub-item or any subsequent sub-item under Items Nos. exceeds 115% or is less than 85% of the estimated quantity of any such sub-item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

(End of clause)

52.232-36 ARITHMETIC DISCREPANCIES – EFARS

- (a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of bidding schedule as submitted by the bidder:
 - (1) Obviously misplaced decimal points will be corrected;
 - (5) Discrepancy between unit price and extended price, the unit price will govern;
 - (6) Apparent errors in extension of unit prices will be corrected;
 - (7) Apparent errors in addition of lump sum and extended prices will be corrected.
- (b) For the purpose of bid evaluation, the government will proceed on the assumption that the bidder intends his bid to be evaluated on basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.
 - (c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low. (End of statement)

Each bidder shall submit with its bid a Bid Bond (Standard Form 24) with good and sufficient surety or sureties acceptable to the Government or other security as provided in the clause BID GUARANTEE in the form of twenty percent (20%) of the bid price or \$3,000,000 whichever is lesser. The bid bond penalty may be expressed in terms of a percentage of the bid price or may be expressed in dollars and cents.

52.231-5000 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)— EFARS

- (a) This clause does not apply to terminations. See 52.249-5000, Basis for Settlement of Proposals and FAR Part 49.
- (b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region IV. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.
- (c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.
- (d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(End of clause)

52.232-4004 INVOICE PROCEDURES

In accordance with CONTRACT CLAUSE titled "PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS", the contractor shall submit invoices as follows:

- a. In order to qualify for a periodic payment, the Contractor must submit a proper invoice (request for payment) to the Contracting Officer's Representative (COR) and a determination must be made that supplies or services conform to the contract requirements. This determination will be made for the sole purpose of processing progress payments and will not constitute formal acceptance. The due date for making progress payments shall be as stated in the contract clause: PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS.
- b. The submitted request for payment must be accompanied with documentation adequate to substantiate the amount requested. Substantiation shall be consistent will the clauses in the solicitation titled Quantity Surveys, Purchase Orders, Invoices, etc. satisfactory to the COR.

- c. The Contractor must also include with the payment request a certification as described in the Clause "PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS".
- d. Payment requests will be reviewed for propriety by the COR. Defective invoices will be returned to the Contractor for resolution with defects identified. Along with the returned invoice, the COR may include, at its option, an ENG FORM 93-PAYMENT ESTIMATE reflecting the substantiated and uncontested payment amount. The Contractor will then be given the option of signing and returning the FORM 93 for payment along with the original invoice and certification or resubmitting a revised invoice and certification. To expedite payment, the Contractor may request in writing that the COR retain the defective invoice and immediately process the payment request at the amount determined to be acceptable to the Government.

52.232-5001 CONTINUING CONTRACTS (MAR 1995)—EFARS

- (a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922 (33 U.S. Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations, and from future contribution to the project having one or more non-federal project sponsors. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract.
- (b) The sum of \$150,000 has been reserved for this contract and is available for payments to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds together with funds provided by one or more non-federal project sponsors will be reserved for this contract.
- (c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not entitle the contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (f) and (i) below. No such failure shall constitute a breach of this contract, except that this provision shall not bar a breach-of-contract action if an amount finally determined to be due as a termination allowance remains unpaid for one year due solely to a failure to reserve sufficient additional funds therefore.
- (d) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer will promptly notify the contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.
- (e) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.
- (f) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. The contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, as in effect on the first day of the delay in such payment.
- (g) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under the "Suspension of Work" clause or in any other manner under this contract.

- (h) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.
- (i) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be considered a termination for the convenience of the Government.
- (j) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under the contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

(End of clause)

52.236-4006 SAFETY AND HEALTH REQUIREMENTS MANUAL INTERIM CHANGES, EM 385-1-1 (APR 2001)

This paragraph applies to contracts and purchase orders that require the contractor to comply with EM 385-1-1 (e.g., contracts that include the Accident Prevention clause at FAR 52.236-13 and/or other safety provisions). EM 385-1-1 and its changes are available at http://www.hq.usace.army.mil (at the HQ homepage, select Safety and Occupational Health). The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation.

52.236-4012 *MATERIAL SOURCES*

- a. Concrete aggregate and stone protection materials meeting the requirements of these specifications can be produced from the sources listed in Section 00830 "Attachments":
- b. Materials may be furnished from any of the listed sources or at the option of the Contractor may be furnished from any other sources designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated.
- c. After the award of the contract, the Contractor shall designate in writing only one source for each type of material or one combination of sources from which he proposes to furnish the materials. If the Contractor proposes to furnish materials from a source or from sources not listed, he may designate only a single source for each type of material or single combination of sources for materials. Samples for acceptance testing shall be provided as required by the TECHNICAL PROVISIONS. If a source for materials so designated by the Contractor is not approved for use by the Contracting Officer, the Contractor may not submit for approval other sources but shall furnish the materials from approved sources selected from the list at no additional cost to the Government.
- d. Approval of a source of materials is not to be construed as approval of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable as determined by the Contracting Officer. Materials produced from an approved source shall meet all the requirements of the TECHNICAL PROVISIONS of these specifications.

52.236-4014 **PURCHASE ORDERS**

Two legible copies of each purchase order issued by the Contractor or the Contractor's subcontractors for materials and equipment to be incorporated into the project, shall be furnished the Contracting Officer as soon as issued. Each purchase order shall (1) be clearly identified with applicable Department of Army contract number, (2) carry and identifying number, (3) be in sufficient detail to identify the material being purchased, and (4) indicate a definite delivery date. At the option of the Contractor, the copies of the purchase orders may or may not indicate the price of the articles purchased.

52.236-4025 FLOATING PLANT EQUIPMENT (MAY 1999)

When mechanized equipment is operated on floating plant, the contractor shall provide positive and acceptable means of preventing this equipment from moving or falling into the water. The type of equipment addressed by this clause includes front-end loaders, bulldozers, trucks (both on and off-road), backhoes, trackhoes, and similar equipment. If the Contractor plans to use such equipment on floating plant, an activity hazard analysis must be developed for this feature of work. The plan must include a detailed explanation of the type or types of physical barriers, curbs, structures, etc., which will be incorporated to protect the operator and prevent the equipment from entering the water. Nonstructural warning devices may be considered for situations where the use of structural barriers is determined to be impracticable. The activity hazard analysis must thoroughly address the procedure and be submitted to the Corps of engineers for review and acceptance prior to start of this feature of work.

52.236-4061 **OBSTRUCTION OF CHANNEL**

The Government will not undertake to keep the channel free from vessels or other obstructions, except to the extent of such regulations, if any, as may be prescribed by the Secretary of the Army, in accordance with the Provisions of Section 7 of the River and Harbor Act approved August 8, 1917. The Contractor will be required to conduct the work in such manner as to obstruct navigation as little as possible. The Contractor shall consult with the appropriate Coast Guard office to determine whether a Notice to Mariners will need to be issued for construction-related activities that might interfere with navigation or be interfered with by such navigation. (Point of Contact: Marine Safety Detachment, St. Paul, Minnesota, 651-290-3991) If the Contractor's plant so obstructs the channel as to make difficult or endanger the passage of vessels, said plant shall be promptly moved on the approach of any vessel to such an extent as may be necessary to afford a practicable passage. Upon the completion of the work the Contractor shall promptly remove his plant, including ranges, buoys, piles, and other marks placed by him under the contract whether in navigable waters or on shore.

52.236-5000 PLANT AND MATERIAL REMOVAL AFTER CONTRACT TERMINATION (MAR 1995)—EFARS

Should this contract be terminated as provided in clause 52.232-5001 because of the failure of Congress to provide additional funds for its completion, the contractor may be permitted to remove plant and material on which payments for preparatory work have been made, subject to an equitable deduction from the amounts due the contractor to reimburse the United States for the unabsorbed value of such plant and material.

(End of clause)

52.239-4001 YEAR 2000 COMPLIANCE (FAR 39.106) (JUL 1998)

The contractor shall ensure that, with respect to any design, construction, goods, or services under this contract as well as any subsequent task/delivery orders issued under this contract (if applicable), all information technology contained therein shall be Year 2000 compliant. Specifically, the contractor shall perform, maintain, and provide an inventory of all major components to include structures, equipment, items, parts, and furnishings under this contract and each task/delivery order which may be affected by the Year 2000 compliance requirement.

52.245-4002 GOVERNMENT-FURNISHED PROPERTY IDENTIFICATION AND LOCATION

- a) The Government will furnish to the Contractor the property listed below to be incorporated or installed into the work or used in performing the contract. The Contractor shall arrange for pickup of the Government furnished property, which is located at the storage building in Grand Forks, ND. The Contractor shall arrange pickup of the property by contacting Mr. T. Eidsen at Telephone No. 701-772-8292. When the property is picked up, the Contractor shall verify its quantity and condition and acknowledge receipt in writing to the Contracting Officer. The Contractor shall also report in writing to the Contracting Officer within 24 hours of pickup any damage to or shortage of the property as received. All such property shall be installed or incorporated into the work at the expense of the Contractor, unless otherwise indicated in this contract.
 - b) The following is a list of Government-Furnished Property: See Technical Section 01000
- c) The Contractor is required to accept delivery, load, unload, and transport the property to the job site at its own expense. When the property is delivered, the Contractor shall verify its quantity and condition and acknowledge receipt in writing to the Contracting Officer. The Contractor shall also report in writing to the Contracting Officer within 24 hours of delivery any damage to or shortage of the property as received. All such property shall be installed or incorporated into the work at the expense of the Contractor, unless otherwise indicated in this contract.

52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

- (a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.
- (b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.
- (c) Government inspections and tests are for the sole benefit of the Government and do not--
- (1) Relieve the Contractor of responsibility for providing adequate quality control measures;
- (2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

- (3) Constitute or imply acceptance; or
- (4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) of this section.
- (d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.
- (e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.
- (f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.
- (g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.
- (h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.
- (i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.
- (b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

- (c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--
- (1) The Contractor's failure to conform to contract requirements; or
- (2) Any defect of equipment, material, workmanship, or design furnished.
- (d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.
- (e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.
- (f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.
- (g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--
- (1) Obtain all warranties that would be given in normal commercial practice;
- (2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and
- (3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.
- (h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.
- (i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.
- (j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of clause)

52.246-4001 LABORATORY AND TESTING FACILITIES

The Contractor shall provide and maintain all measuring and testing devices, laboratory equipment, instruments, transportation, and supplies necessary to accomplish the required testing. All measuring and testing devices shall be calibrated at established intervals against certified standards. The Contractor's measuring and testing equipment shall be made available for use by the Government for verification of their accuracy and condition as well as for any inspection or test desired pursuant to SECTION 00700: INSPECTION OF CONSTRUCTION. The location of the laboratory shall be convenient to the site such that test results are available prior to proceeding with the next sequential phase of the work.

52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

- "Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:
- (1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.
- (2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.
- (3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.
- (4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).
- (5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate."

(End of Clause)

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DIVISION 00 - DOCUMENTS

SECTION 00830

ATTACHMENTS INDEX

06/02

-- End of Document Table of Contents --

SECTION 00830

ATTACHMENTS INDEX 06/02

ATTACHMENT	TITLE
1	WAGE RATES
2	MATERIAL SOURCES
3	BNSF RAILROAD AGREEMENT
4	BNSF EARTHWORK ZONE OF INFLUENCE FIGURE
5	ABANDONED WATER TREATMENT PLANT CLEAN UP LETTER
6	MNDOT STANDARD SHEET 5-297.221 - PAVEMENT JOINTS

SECTION 00830

ATTACHMENT 1

WAGE RATES

GENERAL

DECISION NUMBER	CONSTRUCTION TYPE	PAGE
MN 020061	Heavy	1 through 28
ND 020014	Heavy	1 through 2

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General Decision Number MN020061

General Decision Number MN020061 Superseded General Decision No. MN010061 State: Minnesota Construction Type: **HEAVY** SEWER AND WATER LINE TREATMENT PLANT County(ies): HENNEPIN HOUSTON ANOKA SCOTT BENTON SHERBURNE ISANTI OLMSTED CARVER ST LOUIS OLMSTED POLK RAMSEY CHISAGO STEARNS WASHINGTON WRIGHT CLAY DAKOTA TREATMENT PLANTS, HEAVY, SEWER & WATER LINES Modification Number Publication Date 0 03/01/2002 COUNTY(ies): HENNEPIN ANOKA SCOTT BENTON HOUSTON SHERBURNE CARVER ISANTI ST LOUIS OLMSTED CHISAGO STEARNS CLAY POLK
DAKOTA WASHINGTON RAMSEY WRIGHT ASBE0034G 06/01/2001 Rates Fringes ANOKA, BENTON, CARVER, CHISAGO, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES INSULATOR/ASBESTOS WORKERS (Includes application of all insulating materials, protective coverings, coatings & finishings to all types 28.09 of mechanical systems) ______ ASBE0049G 06/01/2001 Rates Fringes ST. LOUIS COUNTY: ASBESTOS WORKERS/INSULATORS (Includes application of all insulating materials, protective coverings, coatings & finishings to all types 7.21 of mechanical systems) _____ ASBE0133C 07/01/2000 Rates Fringes CLAY & POLK COUNTIES: ASBESTOS WORKERS/INSULATORS (Includes application of all insulating materials, protective coverings, coatings & finishings to all types of mechanical systems) 20.58 6.85 ASBE0205K 05/01/1998 Rates Fringes ANOKA, BENTON, CARVER, CHISAGO, DAKOTA, HENNEPIN, HOUSTON,

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ISANTI, OLMSTED, RAMSEY, SCOTT, SHE WASHINGTON & WRIGHT COUNTIES: HAZARDOUS MATERIAL HANDLERS (Include preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems)		
BOIL0647E 10/01/1999		
BOILERMAKERS	Rates 23.35	Fringes 9.71
BRMN0001Z 05/01/2001		
ANOKA, CARVER, CHISAGO, DAKOTA, HENN SHERBURNE (City of Elk River), WASHI BRICKLAYERS & STONEMASONS	MEPIN, ISANTI,	RAMSEY, SCOTT,
BRMN0003E 05/01/2001		
ST. LOUIS (South of a line between T	Rates Cownships #54	
north of Cotton) COUNTY: BRICKLAYERS	24.93	9.41
BRMN0003F 06/01/2000		
ST. LOUIS COUNTY (S. of a line between miles north of Cotton)):	Rates een Townships	
MARBLE SETTERS & TILE SETTERS	23.12	3.57
BRMN0007C 05/01/1998	Rates	Fringes
HOUSTON COUNTY: BRICKLAYERS; BLOCKLAYERS; CAULKERS; CLEANERS; POINTERS; & STONEMASONS	19.43	3.80
BRMN0008I 09/01/1998		
OLMSTED COUNTY:	Rates	Fringes
BRICKLAYERS; CAULKERS; CLEANERS; POINTERS; & STONEMASONS	22.08	3.80
BRMN0008J 10/01/1998	Rates	Eringog
OLMSTED COUNTY:		Fringes
TILE SETTERS	19.70 	
BRMN0012C 09/04/2000	Rates	Fringes
POLK COUNTY: BRICKLAYERS		6.17
BRMN0015H 09/04/2000		
CLAY COUNTY:	Rates	Fringes
BRICKLAYERS	25.03	6.17
BRMN0015I 09/04/2000	Rates	Fringes
CLAY COUNTY: CEMENT MASONS	24.63	6.17
CELENT INDOING	<u> </u>	····

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BRMN0016C 05/01/2000		
ST. LOUIS (North of a line between north of Cotton) COUNTY:	Rates Fownships #54 &	2
BRICKLAYERS	23.26	9.23
BRMN1000A 05/01/2000	Rates	Fringog
BENTON, SHERBURNE (Excluding city of COUNTIES:		
BRICKLAYERS; BLOCKLAYERS & STONEMASONS	22.78	8.06
BRMN1000B 05/01/2000	Rates	Fringes
BENTON COUNTY: CEMENT MASONS (Treatment Plants) STEARNS COUNTY: CEMENT MASONS & PLASTERERS	22.29	7.96
(Treatment Plants)	22.29	7.96
BRMN1000C 05/01/2001		
ANOKA, BENTON, CARVER, CHISAGO, CLASSISANTI, POLK, RAMSEY, SCOTT, SHERBUI Duluth and south of Township Line 59 WRIGHT COUNTIES:	RNE, ST. LOUIS	EPIN, HOUSTON, (Excluding
TILE SETTERS	25.99	8.95
BRMN1000D 05/01/1999	Rates	Fringes
MARBLE SETTERS' FINISHERS & TILE SETTERS' FINISHERS	20.59	5.95
BRMN1000E 05/01/2000		
ALL COUNTIES, EXCEPT the city of Du. MARBLE SETTERS	Rates luth in ST. LOUI 25.08	
BRMN1000J 05/01/2000	Rates	Fringes
TERRAZZO WORKERS	26.21	6.85
TERRAZZO BASE MACHINES	24.58	7.96
FLOOR MECHANICS; TERRAZZO WORKERS' FINISHERS	24.25	7.96
GADD01007 05 /01 /1007		
CARP0190I 05/01/1997	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLA		_
RAMSEY, SCOTT, SHERBURNE, STEARNS, LATHERS	22.45	7.04
CARP0190L 06/01/2000		
HOHERON AND OFMERED COUNTIES	Rates	Fringes
HOUSTON AND OLMSTED COUNTIES LATHERS		4.04
CARP0361G 05/01/2001	Rates	Fringes
ST. LOUIS (Alborn, Arnold, Bartlett Clinton, Culver, Duluth, Floodwood Lakewood, Meadowlands, Munger, Palm	, Birch, Brookst , Gowan, Island	cone, Canyon, , Kelsey,
Taft) COUNTY: CARPENTERS (Treatment Plants)	20.54	9.91

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CARP0361J 05/01/2001	Rates	Fringes
POLK & ST. LOUIS COUNTIES LATHERS	20.82	9.91
CARP0361M 05/01/2001		
ST. LOUIS (Alborn, Arnold, Bartlett, Clinton, Culver, Duluth, Floodwood, Lakewood, Meadowlands, Munger, Palm Taft) COUNTY:	Gowan, Isla mers, Payne,	kstone, Canyon, nd, Kelsey, Prasit, Shaw &
SOFT FLOOR LAYERS	19.73 	9.91
CARP0548F 05/01/2000	Rates	Fringes
ANOKA, BENTON, CARVER, CHISAGO, CLAY radius), DAKOTA, HENNEPIN, HOUSTON, Grand Forks & up to 5 miles radius) STEARNS, WASHINGTON & WRIGHT COUNTI	<pre>(Moorhead & ISANTI, OLM), RAMSEY, SC [ES:</pre>	up to 5 miles STED, POLK (East OTT, SHERBURNE,
MILLWRIGHTS (Treatment Plants)	26.24 	7.58
CARP0596D 06/01/1999	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HENN SHERBURNE (E. of Hwy #169, inclu. Z River), WASHINGTON & WRIGHT (S. of Buffalo & Monticello) COUNTIES:	NEPIN, ISANTI Zimmerman, Bi	, RAMSEY, SCOTT, g Lake & Elk
SOFT FLOOR LAYERS	21.73	8.32
CARP0596I 05/01/1997	Datos	Fringes
TERRAZZO WORKERS FINISHERS	Rates 22.69	5.47
CARP0606G 05/01/2000		
ST. LOUIS COUNTY (Excluding Alborn, Brookstone, Canyon, Clinton, Culver Island, Kelsey, Lakewood, Meadowlar Prasit, Shaw & Taft): CARPENTERS; PILEDRIVERMEN & SOFT	Arnold, Bart r, Duluth, Fl nds, Munger,	oodwood, Gowan, Palmers, Payne,
FLOOR LAYERS (Treatment Plants)	18.44 	9.02
CARP0606I 05/01/2000	Rates	Fringes
<pre>POLK COUNTY (Excluding East Grand For outside city limits): CARPENTERS & PILEDRIVERMEN</pre>	orks and an a	
(Treatment Plants)	15.53 	6.87
CARP0930F 05/01/1998	Rates	Fringes
· · · · · · · · · · · · · · · · · · ·	10.86	4.70
CARP1176B 06/01/1998		
CLAY COUNTY (City of Moorhead & a ra of the city limits) & POLK COUNTY (5 miles outside city limits): CARPENTERS (Treatment Plants - Does not include Acoustical or Drywall	East Grand F	
Mechanics) PILEDRIVERMEN (Treatment Plants)	16.75 18.75	3.05 3.05

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CARP1348C 05/01/2000		
	Rates	Fringes
CLAY (Excluding Moorhead & up to 5		
East Grand Forks & up to 5 miles r MILLWRIGHTS (Treatment Plants)	21.66	10.29
CARP1382D 06/01/2001	D .	- ·
HOUSTON COUNTY:	Rates	Fringes
CARPENTERS & PILEDRIVERMEN		
(Treatment Plants)	18.52	6.03
OLMSTED COUNTY: CARPENTERS & PILEDRIVERMEN		
(Treatment Plants)	22.78	6.03
CARP9900M 05/01/2001	Rates	Fringes
ANOKA, CARVER, CHISAGO, DAKOTA, HEN		
SHERBURNE (Excluding St. Cloud & e	extending 5 mil	es beyond the
city limits of St. Cloud), WASHING CARPENTERS; INSULATORS; &	TON & WRIGHT C	COUNTIES:
PILEDRIVERMEN (Treatment Plants)	27.06	7.63
CARP9900N 05/01/2000	Rates	Fringes
CARPENTERS & PILEDRIVERMEN (Heavy,		
AREA 1	22.77	8.50
AREA 2	20.29	7.53
AREA 3 AREA 4	17.22 19.84	9.02 7.53
AREA 5	21.05	9.02
AREA 6	21.09	8.98
AREA 7	21.49	8.98
AREA 1 - ANOKA, CARVER, CHISAGO, D RAMSEY, SCOTT, SHERBURNE (South of		
T. 33-N and east of the western b	oundary of R.	27-W),
WASHINGTON & WRIGHT (East of & In	cluding Minnes	sota Highway #25)
COUNTIES AREA 2 - BENTON, SHERBURNE (NW thr	ree-fourths. In	ncluding Clear
Lake & Becker), STEARNS & WRIGHT		
Haven & Maple Lake) COUNTIES		
AREA 3 - CLAY & POLK COUNTIES AREA 4 - HOUSTON & OLMSTED COUNTIE	'S	
AREA 5 - ST. LOUIS COUNTY (Northea		Including Cook,
Cusson & Ely & Western Strip, Inc	luding Chishol	.m, Orr &
Greaney) AREA 6 - ST. LOUIS COUNTY (Souther	n one-third I	naludina
Fond Du Lac, Floodwood, Cotton &		including
AREA 7 - ST. LOUIS COUNTY (Duluth)		
CARP9900Q 05/01/2001		
CARF 9500Q 0570172001	Rates	Fringes
BENTON, SHERBURNE (Extreme NW porti		
extending 5 miles beyond the city COUNTIES:	limits of St.	Cloud) & STEARNS
CARPENTERS & PILEDRIVERMEN		
(Treatment Plants)	19.91	
FIEC0110k 05/01/2001		
ELEC0110K 05/01/2001	Rates	Fringes
ANOKA (Except Anoka & Fridley Towns	hips & the cit	ies of Andover,
Anoka, Columbia Heights, Coon Rapi Spring Lake Park), CHISAGO, DAKOTA		
PATTING HOVE LOTY! CUIDARO!	, ISHNII, KAME	TI, OUEKDUKNE

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(East of Becker & Santiago Township ELECTRICIANS CABLE SPLICERS	es) & WASHINGTON 28.28 29.28	N COUNTIES: 13.19 13.47
ELEC0110L 03/01/1998		
SOUND, SIGNAL & COMMUNICATIONS WORK: Technician (Installation of	Rates	Fringes
Controller Only) Installer (Excluding Controller	19.22	.58+a+b
Work) FOOTNOTES:	11.31	.34+a+b
a. 1 year's service - 5 days' paid 10 days' paid vacation; 5 years' service - 14 day service - 16 days' paid vacation; 1 days' paid vacation; 12 years' service to a Paid Holidays: New Year's Day	ervice - 12 days vs' paid vacation 1 years' service vice - 20 days'	s' paid on; 9 years' ce - 18 paid
Labor Day; Thanksgiving Day; Day Af normal work day preceding Christmas		
ELEC0160D 04/01/2001		
LINE CONSTRUCTION:	Rates	Fringes
Lineman; Cable Splicer; Dynamiter;		
Special Equipment Operator; & Technician	26.71	9.51
Equipment Operator	22.97	8.47
Groundman/Truck Driver; & Pole Treating Truck Driver LINE CLEARANCE:	18.70	7.29
Tree Trimmer; Tractor Operator	18.44	7.22
Groundman/Truck Driver	12.91	5.68
Groundman	11.99	5.43
ELEC0242G 06/01/2001	Rates	Fringes
ST. LOUIS COUNTY (South part bounded line of Kelsey Township extended ea	d on the north bast & west):	by the north
ELECTRICIANS	28.87 	9.53
ELEC0292F 05/01/2000		
AREA 1: ANOKA (Andover, Anoka, Colu	Rates	Fringes
Fridley, Hilltop, Ramsey, Spring Lak COUNTIES (East of Hwy 25 to Hwy 10 a West to the Missippi River), CARVER, COUNTIES ELECTRICIANS:	te Park), BENTON and an imaginary	N AND SHERBURNE y line straight
Electricians	27.50	12.18
Cable Splicers	28.50	12.62
AREA 2: BENTON AND SHERBURNE COUNTI and an imaginary line straight West		
AND STEARNS COUNTY ELECTRICAL CONTRACTS OVER \$300,000:		
Electricians	23.80	10.97
Cable Splicers	24.80	11.43
ELECTRICAL CONTRACTS UNDER \$300,000 Electricians	20.92	9.64
Cable Splicers	21.92	10.11
ELEC0294I 06/01/2001	Rates	Fringes

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ST. LOUIS COUNTY (North part bounded line of Ellsburg Township, extended		the south
ELECTRICIANS CABLE SPLICERS	26.35	
ELEC0343N 06/01/2001		
OLMSTED COUNTY (City of Rochester &	Rates 10 mile radius):	Fringes
Electricians	22.99 23.99	
Cable Splicers HOUSTON & OLMSTED (Excluding City of		
radius) COUNTIES:		
ELECTRICAL INSTALLATIONS OVER \$300 Electricians		9.12
Cable Splicers	23.99	9.26
ELECTRICAL INSTALLATIONS UNDER \$300 Electricians	0,000.00:	8.75
Cable Splicers	20.24 21.24	8.89
ELEC1426J 06/01/1998		
	Rates	Fringes
CLAY & POLK COUNTIES:		
ELECTRICIANS: Electricians	14.70	4.64
	15.45	
ENGI0049Y 05/01/2001		
DOMED HOLLDMENT ODED MODE / Through the con-		Fringes
POWER EQUIPMENT OPERATORS (Treatment GROUP 1	28 99	7.55
GROUP 2	28.65	7.55 7.55
GROUP 3	27.24	7.55
GROUP 4		7.55
GROUP 5	26.73 25.22	7.55
GROUP 6	25.22	7.55
GROUP 7 GROUP 8	24.10 22.09	7.55
POWER EQUIPMENT OPERATOR CLASSIFICA		7.33
GROUP 1 - Helicopter Operator; Truck		with
200' of Boom & Over, including Jib		
Boom & over, including jib); & Towe		
GROUP 2 - Truck & Crawler Crane with not including 200' of Boom, including	1 150' of Boom, u	p to but
200' & Over, Concrete Pump 164 ft Bo		Lane
GROUP 3 - Traveling Tower Crane; Mas		le Driving
Operator (when 3 drums are used); To		
but not including 150' of Boom, incl		
Stiffleg); Tower Crane (Stationary)		l Terrain
Vehicle Crane, Boom Truck over 100 t		\ •
GROUP 4 - Crawler Backhoe; Hoist Eng Locomotive Operator; Overhead Crane		
perimeter); & Tractor Operator with		Darraring
GROUP 5 - Air Compressor Operator 45		
machines); Pump Operator and/or Conv		
machines); Mechanic; Pumpcrete or Co Operator; Forklift; Boom Truck up to		
Operator; Drill Rig - Heavy Rotary of		
Caisson Drilling for Elevator Cyling		Q 101
Construction; Front End Loader (Over		st Engineer
(1 or 2 drums); Straddle Carrier Ope	erator; Power Pla	nt Engineer
(100 KW & over on multiples equal to		Tractor
Operator over D2; & Well Point Pump		
GROUP 6 - Concrete Batch Plant Opera Tractor Operator D2 or similar size		
Tractor operator DZ or Similar Size	a rronc mid noa	uci

Operator, up to 1 cu. yd. GROUP 7 - Air Compressor Operator 600 CFM or Over; Pump and/or Conveyor Operator; Brakeman; Pick-up Sweeper (1 cu. yd. & over Hopper capacity); Truck Crane Oiler; & Welding Machine Operator, Fireman temporary heat. GROUP 8 - Mechanical Space Heater (Temporary Heat); Oiler or Greaser; & Elevator Operator ______ ENGI0049Z 05/01/2001 Rates Fringes POWER EQUIPMENT OPERATORS (Heavy, Sewer & Water Lines): ANOKA, CARVER, CHISAGO (S. of the northern boundary of T. 34-N & that part consisting substantially of the cities of Thomson, Cloquet, Scanlon & Carlton), DAKOTA, HENNEPIN, RAMSEY, SCOTT, SHERBURNE (S. of the northern boundary of T. 33-N & E. of the western boundary of R. 27-W), ST. LOUIS, WASHINGTON & WRIGHT (E. of & inclu. Hwy #25) COUNTIES: GROUP 1 25.57 7.55 GROUP 2 25.02 7.55 GROUP 3 7.55 24.84 GROUP 4 24.72 7.55 GROUP 5 21.68 7.55 GROUP 6 20.47 BENTON (E. of the western right-of-way of U.S. Hwy #10), CHISAGO (Exclu. area S. of the northern boundary of T. 34-N), HOUSTON, ISANTI, OLMSTED, SHERBURNE (Excluding area S. of the northern boundary of T. 33-N and E. of the western boundary of R. 27-W), STEARNS (E. of the western right-of-way of Minn. Hwy #15) & WRIGHT (Exclu. area E. of Hwy #25) COUNTIES: GROUP 1 7.55 23.61 GROUP 2 23.16 7.55 GROUP 3 7.55 22.99 GROUP 4 22.86 7.55 GROUP 5 20.29 7.55 19.42 GROUP 6 BENTON (Excluding E. of the western right-of-way of U.S. Hwy #10), CLAY, POLK & STEARNS (Excluding area E. of the Western right-of-way of Minn. Hwy #15) COUNTIES: GROUP 1 21.45 GROUP 2 20.52 7.55 7.55 GROUP 3 20.32 20.21 7.55 GROUP 4 18.50 7.55 GROUP 5 7.55 GROUP 6 17.90 POWER EQUIPMENT OPERATOR CLASSIFICATIONS GROUP 1 - Helicopter Pilot; *Crane with over 135' Boom, excluding Jib; Dragline, Crawler, Hydraulic Backhoe and/or other similar equipment with Shovel-type Controls 3 cu. yds. & over Mfg. rated Cap.; & Pile Driving when 3 Drums are in use GROUP 2 - Cableway; Concrete Mixer, Stationary Plant over 34E; Derrick (Guy or Stiffleg) (Power) (Skids or Stationary); Diver Dragline, Crawler, Hydraulic Backhoe and/or similar equipment with Shovel-type Controls, up to 3 cu. yds. Mfg. rated cap.; Dredge or Engineers, Dredge (Power) & Engineer; Front End Loader, 5 cu. yds. & over; Grader or Motor Patrol, Finishing Earthwork & Bituminous; Locomotive Crane; Master Mechanic; Mixer (Paving) Concrete Paving, Road; Mole, including Power Supply; Mucking Machine, including Mucking Operations, Conway or similar type; Piledriving; Refrigeration Plant Engineer; Tandem Scraper; Tractor - Boom type; Truck Crane - Crawler Crane; & Tugboat 100 HP & over GROUP 3 - Dual Tractor; Elevating Grader; Pumpcrete; Scraper -Struck Cap. 32 cu. yds. & over; & Self-propelled Traveling Soil Stabilizer

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GROUP 4 - Air Track Rock Drill; Articulated Hauler Terex,
  Caterpillar or similar type; Asphalt Bituminous Stabilizer
  Plant; Automatic Road Machine (CMI or similar); Backfiller;
  Bituminous Roller (8 Tons & over); Bituminous Spreader &
  Finishing (Power); Boom Truck (Power operated Boom); Brokk or
  R.T.C. 750 Remote Control or Similar types with all
  attachments; Cat & Scraper; Cat Tractor with Rock Wagons or
  similar types; Challenger 75-D or 85-D when pulling Scraper or
  Bulldozer; Chip Harvester & Tree Cutter over 150 HP; Concrete
  Batch Plant; Concrete Mixer on jobsite over 14S; Concrete
 Mobile; Crushing Plant (Gravel & Stone) or Gravel Washing,
  Crushing & Screening Plant; Curb Machine; Directional Boring
 Machine; Dope Machine (Pipeline); Drill Rigs, Heavy Rotary or
  Churn or Cable Drill; Fork Lift or Straddle Carrier; Fork Lift
  or Lumber Stacker; Front End Loader, over 1 cu. yd.; Hoist
  Engineer (Power); Hydraulic Tree Planter; Launcherman
  (Tankerman or Pilot License); Lead Greaser; Locomotive;
 Mechanic; Milling, Grinding & Planing Machine; Morbark Tub
  Grinder or Similar Type; Multiple Machines, such as Air
  Compressors, Welding Machines, Generators, Pumps; Pavement
  Breaker or Tamping Machine (Power Driven) Mighty Mite or
  similar type; Pickup Sweeper, 1 cu. yd. & over Hopper Cap.;
  Pipeline Wrapping, Cleaning or Bending Machine; Power Plant
  Engineer, 100 K.W.H. & over; Power Actuated Horizontal Boring
 Machine, over 6"; Pugmill; Rubber- tired Farm Tractor, Backhoe
  Attach.; Scraper, up to 32 cu. yds.; Skid Steer Loader, over 1
  cu. yd. with Backhoe Attachment; Slip Form (Power Driven)
  (Paving); Tie Tamper & Ballast Machine; Tractor, Bulldozer;
 Tractor Operator, over 50 HP with Power Take-off; Trenching
 Machine (Sewer, Water, Gas); Well Point Installation; &
  Dismantling or Repair Mechanic
 GROUP 5 - Air Compressor, 600 CFM or over; Bituminous Roller
  (Under 8 tons); Bituminous Rubber-tired Roller; Bituminous
  Spreader & Bituminous Finishing Machine Tender (Power);
  Concrete Distributor & Spreader Finishing Machine, Longitudinal
  Float, Joint Machine, & Spray; Concrete Saw (Multiple Blade)
  (Power Operated); Form Trench Digger (Power); Front End Loader,
  up to & incl. 1 cu. yd.; Grader (Motor Patrol); Gunite Gunall;
 Hydraulic Log Splitter; Loader (Barber Greene or similar type);
 Payhauler or similar type; Post Hole Driving Machine/Post Hole
 Augar; Power Actuated Auger & Boring Machine; Power Actuated
  Jack; Pump; Self-propelled Chip Spreader (Flaherty or similar);
  Sheep Foot Compactor with Blade - 200 HP & over; Shouldering
 Machine (Power) Apsco or similar type inclu. self-propelled
  Sand & Chip Spreader; Stump Chipper & Tree Chipper; Tractor
 Operator, Bulldozer, 50 HP or less; & Tree Farmer (Machine) GROUP 6 - Challenger 75-D or 85-D when pulling Disk or Roller;
  Conveyor; Dredge Deck Hand; Fireman or Tank Car Heater; Gravel
  Screening Plant (Portable not Crushing or Washing); Greaser
  (Truck or Tractor); Leverman; Mechanic tender; Mechanic, Space
 Heater (Temporary Heat); Oiler (Power Shovel, Crane, Dragline);
 Power Sweeper; Roller on Gravel Compaction; Self-propelled
 Vibrating Packer (35 HP & over); Sheep Foot Roller; Tractor,
 Wheel Type (over 50 HP); & Truck Crane Oiler
 *CRANE OVER 135' BOOM, EXCLUDING JIB - $ .25 PREMIUM;
  CRANE OVER 200' BOOM, EXCLUDING JIB - $ .50 PREMIUM
UNDERGROUND WORK:
 TUNNELS, SHAFTS, ETC. - $ .25 PREMIUM
 UNDER AIR PRESSURE - $ .50 PREMIUM
HAZARDOUS WASTE PROJECTS (PPE Required):
LEVEL A - $1.25 PREMIUM
LEVEL B - $ .90 PREMIUM
LEVEL C - $ .60 PREMIUM
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IRON0512M 07/01/2001

Rates Fringes ANOKA, BENTON, CARVER, CHISAGO, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES IRONWORKERS 28.45 10.79 _____ IRON0563L 05/01/2001 Rates Fringes ST. LOUIS COUNTY: 23.13 TRONWORKERS 11.85 _____ IRON0793F 05/01/2001 Rates Fringes CLAY & **POLK** COUNTIES: IRONWORKERS 18.80 8.82 ______ LABO0010J 05/01/2000 Rates Fringes LANDSCAPERS: Seeding, Sodding & Planting of evergreen & deciduous 12.38 shrubs & trees 4.36 ______ LABO0132I 01/01/2000 Rates Fringes ANOKA, BENTON, CARVER, CHISAGO, CLAY, DAKOTA, HENNEPIN, HOUSTON, ISANTI, OLMSTED, RAMSEY, SCOTT, SHERBURNE, STEARNS, WASHINGTON & WRIGHT COUNTIES: LABORERS, Asbestos Abatement 19.16 LABO0132M 05/14/2001 Rates ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES LABORERS (Treatment Plants): 24.48 GROUP 1 5.70 5.70 GROUP 2 23.98 GROUP 3 25.48 5.70 FLAGPERSON 21.85 LABORERS CLASSIFICATIONS GROUP 1 - Construction; Carpenter Tender; Concrete; Damp Proofer Below Grade; Drill Runner Tender; Dumpman - Dirt, Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker - Corker; Handler; Material Handler - Power Buggy; Rebar; Snow Blower Operator; Signal Person; Asbestos and Hazardous Waste Technician; Hydro Blast or Waterblast; Chain Saw Operator; Concrete Saw, Drill Operator; Concrete Vibrator; Demolition & Remodeling, Excluding Demolition of an entire Structural System; Mason Tender; Mortar Mixer - Cement or any other substitute Material or Composition; Pipe Handler; Pneumatic & Electric Tool, Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator, etc.; Swing Stage Line Scaffold (Not including Patent" Scaffolding); Torchman - Gas, Electric, Thermal or similar device; & Remote Control Tamper GROUP 2 - Caisson Work; Mounted Wall Saw Operator; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Pipe Rehab Technical, including Cleaning, Cutting, Cameraing, etc.; Refractory Worker; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; & Underpinning GROUP 3 - Driller for Blasting purposes; Dynamite Blaster or substitute products Tovex TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc. ______

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LABO0132P 06/01/1999

Rates Fringes ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES: PLASTER TENDERS (Treatment Plants) 23.85 ______ LABO0405D 05/01/1999 Rates Fringes HOUSTON COUNTY: LABORERS (Treatment Plants): GROUP 1 15.49 4.89 GROUP 2 16.19 4.89 FLAGPERSON 13.66 4.89 OLMSTED COUNTY: LABORERS (Treatment Plants): 16.94 4.89 GROUP 1 17.64 GROUP 2 4.89 FLAGPERSON 4.89 15.06 LABORER CLASSIFICATIONS

LABORER CLASSIFICATIONS

GROUP 1 - Construction; General; Carpenter Tender; Concrete;
Damp Proofer Below Grade; Dumpman - Dirt, Asphalt, Concrete,
Cement; Heater Tender; Hot Tar Caulker - Corker; Firewatch;
Joist Handler; Material Handler - Power Buggy; Rebar;
Signalperson; Snow Blower Operator; Demolition & Wrecking,
Including Remodeling; Chain Saw Operator; Concrete Saw, Drill
Operator; Concrete Vibrator; Pipe Handler; Pneumatic & Electric
Tool, Jackhammer, Paving Buster, Chipping Hammer, Tamper
Operator, etc.; Swing Stage Line Scaffold (not including
"Patent" Scaffolding); & Remote Control Tamper
GROUP 2 - Pipe Rehab Technician, including Cleaning, Cutting,
Cameraing, etc.; Caisson Work; Nozzle Operator - Gunite,

GROUP 2 - Pipe Rehab Technician, including Cleaning, Cutting, Cameraing, etc.; Caisson Work; Nozzle Operator - Gunite, Cement, Sandblasting; Pipelayer; Refractory Worker; Sheeting Setter & Driver, Heavy Building Excavation; Underground Work - Open Ditch or Excavation 8' Below Grade; Underpinning; Mason Tender; Mortar Mixer - Cement or any other substitute Material or Composition; Driller for Blasting Purposes; Dynamite Blaster or substitute products Tovex TR, Water, Gas, Gel, Bristar, Silent Dynamite, etc.

LABO0563C 05/01/2001

Rates Fringes
BENTON, CLAY (Except City limits of Moorhead) & STEARNS COUNTIES:
LABORERS (Treatment Plants):
Total Construction Projects Over \$950,000:

TOTAL CONSCIUCTION TID JECES OVER	γ <i>230</i> ,000•	
GROUP 1	18.02	6.72
GROUP 2	18.77	6.72
GROUP 3	19.02	6.72
FLAGPERSON	16.11	6.72
Total Construction Projects Under	\$950,000:	
GROUP 1	16.27	6.72
GROUP 2	17.02	6.72
GROUP 3	17.27	6.72
FLAGPERSON	14.54	6.72
INDODED OF ACCTULONIC		

LABORER CLASSIFICATIONS

GROUP 1 - Construction; Asbestos & Hazardous Waste Technician; Carpenter Tender; Chain Saw Operator; Concrete Saw, Drill Operator; Concrete Vibrator; Concrete; Damp Proofer Below Grade; Demolition & Remodeling, Excluding Demolition of an entire Structural System; Drill Runner Tender; Dump Person - Dirt, Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker-Corker; Hydro Blast or Waterblaster; Joist Handler; Mason Tender; Material Handler - Power Buggy; Mortar Mixer - Cement or any other Substitute material or Composition; Pipe Handler; Pneumatic & Electric Tools, Jackhammer, Paving Buster, Chipping

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Hammer, Tamper Operator, etc.; Rebar; Remote Control Tamper;
Signal Person; Snow Blower Operator; Swing Stage Line Scaffold
(Not including "Patent" Scaffolding); Torchperson - Gas,
Electric, Thermal or similar device
GROUP 2 - Caisson Work; Mounted Wall Saw Operator; Nozzle
Operator - Gunite, Cement, Sandblasting; Pipelayer; Pipe Rehab
Technician (Including Cleaning, Cutting, Cameraing, etc.);
Refractory Worker; Sheeting Setter & Driver, Heavy Building
Excavation; Underground Work - Open Ditch or Excavation 8'
Below Grade; & Underpinning
GROUP 3 - Driller for Blasting Purposes; Dynamite Blaster or
substitute products Tovel TR, Water, Gas, Gel, Bristar, Silent
Dynamite, etc.
_____
LABO0580B 04/19/1999
                                  Rates
                                                 Fringes
CLAY (Moorhead) & POLK (East Grand Forks) COUNTIES:
LABORERS (Treatment Plants) 14.05
                                                   4.34
         LABORER CLASSIFICATIONS
Common; Concrete Bucket; Power Tool Operator; Mortar Mixer;
 Brick & Plasterers' Tender; Jackhammer Work; Hod Carrier;
Non-Metallic Pipe Layer; Gas Line Wrapping or Taping; Cutting
Torch for Demolition; Sandblaster & Gunnite Pot Tender; & Hose
Tender
______
 LABO1091B 05/01/1998
                                  Rates
                                                 Fringes
ST. LOUIS COUNTY (South of T 55 N):
LABORERS (Treatment Plants):
                                   15.95
                                                 5.39
 GROUP 1
                                                  5.39
                                   16.10
 GROUP 2
                                                  5.39
GROUP 3
                                    16.35
                                   16.65
                                                  5.39
 GROUP 4
 FLAGPERSON
                                   14.05
                                                  5.39
       LABORER CLASSIFICATIONS
 GROUP 1 - General; Carpenter Tender; Concrete Laborer; Damp
 Proofer Below Grade; Drill Runner Tender; Dumpman - Dirt,
 Asphalt, Concrete, Cement; Heater Tender; Hot Tar Caulker -
 Corker; Joist Handler; Rebar; Snow Blower Operator;
  Signalperson; Material Handler (All types Power Buggy); Fire
 Control; Asbestos Removal; & Hazardous Waste
 GROUP 2 - Chain Saw Operator; Concrete Saw, Drill Operator;
  Concrete Vibrator; Demolition & Wrecking, Excluding
 Remodeling; Gunite, Sandblasting Machine Operator; Mason
 Tender; Mortar Mixer - Cement or any other substitute material
  or composition; Pipe Handler; Pneumatic & Electric Tools,
  Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator,
  etc.; Swing Stage Line Scaffold (not including "patent"
  scaffolding); Torchman - Gas, Electric, Thermal or similar
 device; & Hydroblast
 GROUP 3 - Caisson Work; Nozzle Operator - Gunite, Cement,
  Sandblasting; Pipelayer; Refractory Worker; Sheeting Setter &
 Driver, Heavy Building Excavation; Underground Work - Open
 Ditch or Excavation 8' Below Grade; Underpinning; & Hod
 GROUP 4 - Driller for Blasting Purposes; Dynamite Blasters or
 substitute products Tovex TR, Water, Gas, Gel, Bristar, Silent
 Dynamite, etc.; Asbestos Abatement Worker; & Hazardous Waste
 Worker
 LABO1091D 05/01/1999
                                  Rates
                                                 Fringes
ST. LOUIS COUNTY (South of TR 55):
LABORERS:
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```
6.80
  Asbestos Abatement
                                      18.16
  ______
  LABO1097B 05/01/2001
                                     Rates
 POLK COUNTY (Excluding the city limits of East Grand Forks):
 LABORERS (Treatment Plants):
  Projects Under $760,000 including Mechanical & Electrical:
   GROUP 1
                                      13.48 5.06
   GROUP 2
                                      13.67
                                                     5.06
                                      13.84
11.88
   GROUP 3
                                                    5.06
   FLAGPERSON
   Projects $760,000 & Over, including Mechanical & Electrical:
                                      15.68 5.06
   GROUP 2
                                      16.08
                                                     5.06
   GROUP 3
                                      16.28
                                                    5.06
   FLAGPERSON
                                      13.98
                                                     5.06
         LABORER CLASSIFICATIONS
   GROUP 1 - Construction; Carpenter Tender; Concrete; Damp
 Proofer Below Grade; Dump Person - Dirt, Asphalt, Concrete &
  Cement; Heater Tender; Hot Tar Caulker - Corker; Joist
 Handler; Material Handler - Power Buggy; Rebar; Signal Person;
  & Snow Blower Operator; Chain Saw Operator; Concrete Vibrator;
 Demolition & Wrecking, Excluding Remodeling; Mason Tender;
 Mortar Mixer - Cement or Any Other Substitute Material or
 Composition; Pipe Handler; Pneumatic & Electric Tool,
 Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator,
 Etc.; Swing Stage Line Scaffold (Not including "Patent"
 Scaffolding); & Torch Person - Gas, Electric, Thermal or
 similar device; Scrapping, Sweeping & Clean-up; Skid Steer,
 Forklift (Incidental Use)
   GROUP 2 - Creosote Handler; Caisson Work; Concrete Saw Drill
 Operator; Nozzle Operator - Gunite, Cement, Sandblasting;
 Pipelayer; Sheeting Setter & Driver, Heavy Building
 Excavation; Underground Work - Open Ditch or Excavation 8'
 Below Grade; Underpinning; & High Pay/Low Pay - 40 ft. Over or
 Under Ground Floor without Conventional Floor Areas; Pipe-
O Rehab Technician, including Cleaning, Cutting, Camering, etc.;
1 & Wall Mounted Saw Operator
  GROUP 3 - Driller for Blasting Purposes; Dynamite Blaster or
4 substitute products; & Tovex TR, Water, Gas, Gel, Bristar,
5 Silent Dynamite, etc.
6 -----
 LABO1097D 05/01/2001
                                     Rates
                                                    Fringes
0 ST. LOUIS COUNTY (North of T 55 N):
2 LABORERS (Treatment Plants):
3 GROUP 1
                                      19.67
                                                 5.81
4 GROUP 2
                                      20.07
                                                    5.81
5 GROUP 3
                                                    5.81
                                      20.37
6 Flagperson
                                      17.77
                                                    5.81
7 Refractory Worker
                                      21.67
                                                    5.81
         LABORERS CLASSIFICATIONS
   GROUP 1 - Construction; Carpenter Tender; Concrete; Damp
2 Proofer Below Grade; Dump Person - Dirt, Asphalt, Concrete &
3 Cement; Heater Tender; Hot Tar Caulker - Corker; Joist
4 Handler; Material Handler - Power Buggy; Rebar; Signal Person;
5 & Snow Blower Operator; Chain Saw Operator; Concrete Vibrator;
6 Demolition & Wrecking, Excluding Remodeling; Mason Tender;
7 Mortar Mixer - Cement or Any Other Substitute Material or
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3

7 8

9

1

8 9

0

1

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8 Composition; Pipe Handler; Pneumatic & Electric Tool,
9 Jackhammer, Paving Buster, Chipping Hammer, Tamper Operator,
O Etc.; Swing Stage Line Scaffold (Not including "Patent"
1 Scaffolding); & Torch Person - Gas, Electric, Thermal or
2 similar device; Scrapping, Sweeping & Clean-up; Skid Steer,
3 Forklift (Incidental Use)
5
  GROUP 2 - Creosote Handler; Caisson Work; Concrete Saw Drill
6 Operator; Nozzle Operator - Gunite, Cement, Sandblasting;
7 Pipelayer; Sheeting Setter & Driver, Heavy Building
8 Excavation; Underground Work - Open Ditch or Excavation 8'
9 Below Grade; Underpinning; & High Pay/Low Pay - 40 ft. Over or
O Under Ground Floor without Conventional Floor Areas; Pipe-
1 Rehab Technician, including Cleaning, Cutting, Camering, etc.;
2 & Wall Mounted Saw Operator
4
  GROUP 3 - Driller for Blasting Purposes; Dynamite Blaster or
5 substitute products; & Tovex TR, Water, Gas, Gel, Bristar,
6 Silent Dynamite, etc.
7 -----
8
9
 LAB01097G 05/01/1999
0
                                    Rates
                                                   Fringes
1 POLK COUNTY (Excluding the city limits of East Grand Forks);
2 & ST. LOUIS COUNTY (N. of TR 55, but excluding a 20-mile radius
3
  of Grand Forks, North Dakota):
4
5 LABORERS:
                                    18.16
6
 Asbestos Abatement
                                                  6.80
7 -----
8
9 LABO99000 05/01/2000
0
                                    Rates
                                                  Fringes
1 LABORERS (Heavy, Sewer & Water Lines):
2
3 ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT,
4
  SHERBURNE, WASHINGTON & WRIGHT COUNTIES:
5
6
 GROUP 1
                                     20.74
                                                   5.56
                                     20.94
7
  GROUP 2
                                                   5.56
8 GROUP 3
                                                   5.56
                                     21.09
                                                   5.56
9 GROUP 4
                                     21.19
0 GROUP 5
                                                   5.56
                                     21.44
1 GROUP 6
                                     22.74
                                                   5.56
2
  GROUP 7
                                     17.04
                                                   5.31
3
4 BENTON & STEARNS COUNTIES:
5
6
                                     16.79
                                                   5.31
 GROUP 1
7
 GROUP 2
                                     16.99
                                                   5.31
8 GROUP 3
                                     17.14
                                                   5.31
9 GROUP 4
                                     17.24
                                                   5.31
0 GROUP 5
                                     17.49
                                                   5.31
1 GROUP 6
                                     18.79
                                                   5.31
2
  GROUP 7
                                     13.89
                                                   5.11
3
4 CLAY (Excluding City Limits of Moorhead) & POLK (Excluding City
5 Limits of East Grand Forks) COUNTIES:
6
7 GROUP 1
                                     14.34
                                                   4.61
8 GROUP 2
                                     14.54
                                                   4.61
9 GROUP 3
                                     14.69
                                                   4.61
0 GROUP 4
                                     14.79
                                                   4.61
1
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```
2
  GROUP 5
                                        15.04
                                                        4.61
3
  GROUP 6
                                        16.34
                                                        4.61
4
  GROUP 7
                                        12.34
                                                        4.56
5
6 HOUSTON & OLMSTED COUNTIES:
7
8
  GROUP 1
                                        17.94
                                                        5.21
9
  GROUP 2
                                        18.14
                                                        5.21
0
  GROUP 3
                                        18.29
                                                        5.21
1
  GROUP 4
                                        18.39
                                                        5.21
2
  GROUP 5
                                        18.64
                                                        5.21
3
                                        19.94
  GROUP 6
                                                        5.21
4
  GROUP 7
                                        15.04
                                                        5.01
5
6
 ST. LOUIS COUNTY (South of T. 55 N):
7
8
  GROUP 1
                                        19.87
                                                        5.56
9
  GROUP 2
                                         20.07
                                                        5.56
0
  GROUP 3
                                        20.22
                                                        5.56
1
  GROUP 4
                                         20.32
                                                        5.56
2
  GROUP 5
                                        20.57
                                                        5.56
3
  GROUP 6
                                        21.87
                                                        5.56
4
  GROUP 7
                                        16.32
                                                        5.31
5
 ST. LOUIS COUNTY (North of T. 55 N):
6
7
8
                                        19.47
                                                        5.96
  GROUP 1
9
  GROUP 2
                                        19.67
                                                        5.96
0
  GROUP 3
                                        19.82
                                                        5.96
1
  GROUP 4
                                        19.92
                                                        5.96
2
                                        20.17
                                                        5.96
  GROUP 5
3
  GROUP 6
                                        21.47
                                                        5.96
4
  GROUP 7
                                        16.32
                                                        5.31
5
6
           LABORER CLASSIFICATIONS
7
8
  GROUP 1 - Construction; Bituminous Batcherperson (Stationary
9
   Plant); Bituminous Worker - Shoveler, Raker, Floater, Squeegee,
0
   Utility; Blaster Tender; Brick Tender; Carpenter Tender; Cement
   Coverperson Batch Truck; Cement Handler - Bulk, Bag; Concrete
1
2
   Batcherperson; Concrete Handler, Caisson, Footings, Columns,
3
   Piling, Slabs, etc.; Concrete Longitudinal Float Operator
4
   (Manual Bullfloat on Paving); Concrete Shoveler, Tamper &
5
   Puddler (Paving); Conduit Layer; Curb Setter; Damp Proofer
6
   Below Grade; Demolition of an entire Structural System,
7
   Excluding Remodeling; Drill Runner Tender; Dump Operator (Dirt,
8
   Paver, Dumping Batch Truck, etc.); Fabric Installer; Grade
9
   Checker; Hydrant & Valve Setter; Hydro Blast or Waterblaster;
0
   Joint Filler (Concrete Pavement); Kettleperson (Bituminous or
1
   Lead); Labor Wrecking Demolition; Mortar Mixer; Pipe Handler;
2
   Pipelayer ($1.00 Premium); Power Buggy Operator; Pump Operator
3
   (Less than 6"); Reinforced Steel Laborer; Reinforced Steel
4
   Setter (Paving); Retaining Wall Installation; Sand Cushion
5
   Bedmaker; Service Connection Maker (Water, Gas); Signalperson;
6
   Slip Lining of Utility Lines; Soil Stabilizer; Sound Barrier &
   Guard Rail Installation; Squeegeeperson; Stabilizing
7
8
9
   Batcherperson (Stationary Plant); Temporary Heaters & Blower
0
   Tender; Top Person (Sewer, Water or Gas Trench); Traffic
1
   Controller (Traffic Barriers) & Transit/Level
2
3
  GROUP 2 - Chain Saw; Compaction Equipment (Hand Operated or
4
   Remote Control); Concrete Drilling; Concrete Mixer Operator;
```

Concrete Sawer; Concrete Vibrator; Ditch & Other Work more than

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8' Below starting level of manual work; Formsetter; Joint
   Sawer, Mortar; Pipe Fuser/Technician; Pneumatic Tools,
   Jackhammer, Paving Buster, Chipping Hammer, etc.; Remote
9
   Control Demo Machine & Related Accessories
0
    (Electric/Hydraulic); Stone Tender/Mason Tender; & Torchperson
1
   - Gas, Electric, Thermal or Similar Device
2
3
  GROUP 3 - Brick or Block Paving Setter; Caisson Work; Cofferdam
4
5
6
  GROUP 4 - Bottomperson (Sewer, Water or Gas Trench - More than
7
   8' Below starting level or manual Work); Cement Gun Operator
8
   (1 1/2" or Over); Driller - Air Track or Similar; & Nozzle
9
   Operator (Gunite, Sandblasting, Cement)
0
1
  GROUP 5 - Asbestos & Hazardous Waste Tech; Tunnel Laborer;
2
   Tunnel Miner; Tunnel Miner Tender; Underground Laborer; &
3
   Underpinning
4
5
  GROUP 6 - Blasting Person (Dynamite or substitute Products); &
6
   Tunnel Miner Under Pressure
7
8
  GROUP 7 - Flagperson
9 -----
0
1
 LABO9900Q 05/01/1998
2
                                       Rates
3 LABORERS (Heavy, Sewer & Water Lines):
4
5 CLAY (City Limits of Moorhead) & POLK (City Limits of East Grand
6
 Forks) COUNTIES:
7
8
  GROUP 1
                                        13.26
                                                       4.29
                                        13.46
9 GROUP 2
                                                       4.29
0 GROUP 3
                                       13.61
                                                      4.29
                                       13.71
1 GROUP 4
                                                      4.29
2 GROUP 5
                                        13.96
                                                      4.29
3 GROUP 6
                                        15.26
                                                       4.29
4 GROUP 7
                                        11.26
                                                       4.24
5
6
          LABORER CLASSIFICATIONS
7
8
  GROUP 1 - Construction; Bituminous Batcherperson (Stationary
9
   Plant); Bituminous Worker - Shoveler, Raker, Floater, Squeegee,
0
   Utility; Blaster Tender; Brick Tender; Carpenter Tender; Cement
1
   Coverperson Batch Truck; Cement Handler - Bulk, Bag; Concrete
2
   Batcherperson; Concrete Handler, Caisson, Footings, Columns,
3
   Piling, Slabs, etc.; Concrete Longitudinal Float Operator
4
   (Manual Bullfloat on Paving); Concrete Shoveler, Tamper &
5
6
   Puddler (Paving); Conduit Layer; Curb Setter; Damp Proofer
   Below Grade; Demolition of an entire Structural System,
7
   Excluding Remodeling; Drill Runner Tender; Dump Operator (Dirt,
8
9
   Paver, Dumping Batch Truck, etc.); Fabric Installer; Grade
0
   Checker; Hydrant & Valve Setter; Hydro Blast or Waterblaster;
1
   Joint Filler (Concrete Pavement); Kettleperson (Bituminous or
2
   Lead); Labor Wrecking Demolition; Mortar Mixer; Pipe Handler;
   Pipelayer ($1.00 Premium); Power Buggy Operator; Pump Operator
3
4
   (Less than 6"); Reinforced Steel Laborer; Reinforced Steel
5
   Setter (Paving); Retaining Wall Installation; Sand Cushion
6
   Bedmaker; Service Connection Maker (Water, Gas); Signalperson;
   Slip Lining of Utility Lines; Soil Stabilizer; Sound Barrier &
7
   Guard Rail Installation; Squeegeeperson; Stabilizing
8
   Batcherperson (Stationary Plant); Temporary Heaters & Blower
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```
0
   Tender; Top Person (Sewer, Water or Gas Trench); Traffic
   Controller (Traffic Barriers) & Transit/Level
1
2
3
  GROUP 2 - Chain Saw; Compaction Equipment (Hand Operated or
4
   Remote Control); Concrete Drilling; Concrete Mixer Operator;
5
   Concrete Sawer; Concrete Vibrator; Ditch & Other Work more than
   8' Below starting level of manual work; Formsetter; Joint
6
7
   Sawer, Mortar; Pipe Fuser/Technician; Pipe Rehab Technician,
8
   including Cleaning, Cutting, Cameraing, etc.; Pneumatic Tools,
9
   Jackhammer, Paving Buster, Chipping Hammer, etc.; Remote
0
   Control Demo Machine & Related Accessories (Electric/
1
   Hydraulic); Stone Tender/Mason Tender; & Torchperson - Gas,
2
   Electric, Thermal or Similar Device
3
  GROUP 3 - Brick or Block Paving Setter; Caisson Work; Cofferdam
4
5
   Work
6
7
  GROUP 4 - Bottomperson (Sewer, Water or Gas Trench - More than
8
   8' Below starting level or manual Work); Cement Gun Operator
9
   (1 1/2" or Over); Driller - Air Track or Similar; & Nozzle
0
   Operator (Gunite, Sandblasting, Cement)
1
2
  GROUP 5 - Asbestos & Hazardous Waste Tech; Tunnel Laborer;
3
   Tunnel Miner; Tunnel Miner Tender; Underground Laborer; &
4
   Underpinning
5
6
  GROUP 6 - Blasting Person (Dynamite or substitute Products); &
7
  Tunnel Miner Under Pressure
8
  GROUP 7 - Flagperson
9
0
1
2
  PAIN0061F 05/01/2000
                                      Rates
3
                                                     Fringes
4 CHISAGO, DAKOTA, RAMSEY & WASHINGTON COUNTIES:
5
6 PAINTERS:
                                       23.50 8.28
7
  GROUP 1
                                       17.63
8
  GROUP 2
                                                      8.28
9
  GROUP 3
                                       24.25
                                                      8.28
0
1
           PAINTER CLASSIFICATIONS
2
3
  GROUP 1 - Brush; Drywall Finisher; & Paperhanger
4
  GROUP 2 - Drywall Sander
5
  GROUP 3 - Sandblaster; Spray; Swing Stage; Boatswain Chair;
6
   Window Jack; Safety Belt; Erected Structural Steel; Bridges;
7
   & Application of Epoxy Materials & Materials containing over
8
   50% Creosote
9
0
 PAIN0106I 05/01/2001
1
2
                                      Rates
                                                     Fringes
3 ST LOUIS COUNTY
4
5
  GLAZIERS
                                       20.11
                                                       7.24+a
6
7
  FOOTNOTE:
8
  a. 1 to 4 years' service - 1 week's paid vacation; 5 to 11
  years' service - 2 weeks' paid vacation; 11 years' service
0
  or more - 3 weeks' paid vacation
1 -----
2
3 PAIN0106J 05/01/2001
```

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```
Rates
                                            Fringes
5 ST. LOUIS COUNTY:
6
7 PAINTERS:
8 REPAINT:
                            21.23 7.73
9
 Brush & Roller
0
  Paperhanger, Spray, Steel,
                            21.83 7.73
1 and Taper
2 New:
 Brush; Roller
                              22.73 7.73
3
  Brush; Roller
Paperhanger, Spray, Steel,
23.33
7.73
4
5 and Taper
6 -----
7
8
 PAIN0386I 05/01/2000
                               Rates Fringes
9
0 ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (South & East
1 of a line drawn between the town of Santiago in Sherburne County
2
 and the town of Clearwater in Wright County) & WRIGHT COUNTIES:
3
4 PAINTERS:
5 Brush; Roller; & Wallpaper Hanger 24.31 7.72
 Spray; Steel; Sandblaster; Swing
6
  Stage & Epoxy
7
                               25.06 7.72
8
9
0
 PAIN0386J 05/01/2000
                            Rates Fringes
1
2 ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (South & east
3
 of a line drawn between the town of Santiago, Sherburne County
4 and the town of Clearwater, Wright County) & WRIGHT COUNTIES:
5
6 PAINTERS:
7 Drywall Taper/Finisher 23.97 7.85
8
                               17.98 7.85
9 Sander
0 -----
1
2
 PAIN0681E 05/01/2001
                              Rates Fringes
3
4 HOUSTON & OLMSTED COUNTIES:
5
 CORPORATE CITY LIMITS OF ROCHESTER, OLMSTED COUNTY:
6
7
8
  PAINTERS:
                           22.13 6.07
9 Brush & Roller
0 Paperhanger & Steel
                                          6.07
                            22.38
1 Sandblasting & Spray
                            22.63
                                          6.07
2 Stageman & Beltman
                            23.13
                                         6.07
3
4 REMAINING AREA:
5
6
  $600,000 & over in volume including Electrical & Mechanical:
8
  PAINTERS:
9 Brush & Roller
                             22.13
                                         6.07
                                          6.07
                             22.38
0 Paperhanger & Steel
1 Sandblasting & Spray
                             22.63
                                          6.07
2 Stageman & Beltman
                             23.13
4
  Under $600,000 in volume including Electrical & Mechanical:
6 PAINTERS:
                             18.81 6.07
7
 Brush & Roller
```

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```
8 Paperhanger & Steel
9 Sandblasting & Spray
                            19.02
19.24
                                            6.07
                                           6.07
                              19.66
1
2 APPLICATION OF EPOXY, CREOSOTE OR ALL OTHER HIGHLY TOXIC
3 MATERIALS - $ .25 PREMIUM
4 ------
5
6
 PAIN0681H 05/01/2001
7
                               Rates Fringes
8 HOUSTON & OLMSTED COUNTIES:
9
                           21.74 6.07
16.31 6.07
0 DRYWALL FINISHERS
1 DRYWALL SANDERS
2 ------
3
4
 PAIN0880A 05/01/1999
                               Rates Fringes 21.12 2.08+a+b
5
6 SIGN PAINTERS
7
8 FOOTNOTES:
 a. 8 Paid Holidays: New Year's Day; Memorial Day;
9
  Independence Day; Labor Day; Thanksgiving Day; the Day After
0
 Thanksgiving; the last working Day Before Christmas; &
1
2 Christmas Day
3
4 b. Vacation Pay: 3 yrs' service - 2 wks' paid vacation; 6 yrs'
5
6
  service - 3 wks' paid vacation; 15 yrs' service - 4 wks' paid
7
  vacation
8 -----
9
0
 PAIN0884F 06/01/2001
                                Rates
1
                                             Fringes
2 PAINTERS:
3
4 BENTON, SHERBURNE (Western one-half, North & West of a line drawn
5 between the city of Santiago in Sherburne County & the city of
6
 Clearwater in Wright County) & STEARNS COUNTIES:
7
8 Projects Under $8,000.00:
  GROUP 1
                                 15.21 6.57
15.21 6.57
9
  GROUP 2
0
                                 15.81
1
  GROUP 3
                                              6.57
2
3 All Other Work:
                                 19.01 6.57
4 GROUP 1
                                 19.01
5
  GROUP 2
                                              6.57
                                           6.57
6
  GROUP 3
7
8 CLAY & POLK COUNTIES:
9
0 Projects Under $8,000.00:
1
 GROUP 1
                                 14.41 1.87
                                 14.41
15.16
2
 GROUP 2
                                              5.85
3
  GROUP 3
                                              1.87
4
5 All Other Work:
6
                                 18.01 1.87
  GROUP 1
                                 18.01
18.76
7
  GROUP 2
                                              5.85
8
  GROUP 3
                                              1.87
9
        PAINTER CLASSIFICATIONS
0
1
```

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```
2
  GROUP 1: Brush & Roller
  GROUP 2: Drywall Taper & Finisher
4
5
  GROUP 3: Spray; Two Component Paints; Epoxies; Sandblasting &
6
7
   Rigging; Bridge Painting; Work done on Swing Scaffolding,
   Safety Harness, Boatswain's Chair, Coverings & Erection of
8
9
   Scaffolding for same, Work on Erected Structural Steel, Storage
  Bins, Tanks, Abrasive Blasting; Steeple Jack Work which applies
0
1
  to Smokestacks, Elevated Tanks & Erected Towers over 35 ft. &
2
  Flag Poles; & Structural Supports
3 -----
4
5
 PAIN1324E 06/01/1999
6
                                 Rates
7 ANOKA, BENTON, CARVER, CHISAGO, CLAY, DAKOTA, HENNEPIN, HOUSTON,
8
  ISANTI, OLMSTED, POLK, RAMSEY, SCOTT, SHERBURNE, STEARNS,
9
  WASHINGTON & WRIGHT COUNTIES:
0
1 GLAZIERS
                                  24.31
                                               7.89
2
3
  4
5 PLAS0265D 06/01/2000
                                 Rates
6
7 ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT,
  SHERBURNE, WASHINGTON & WRIGHT COUNTIES:
8
9
0
 PLASTERERS
                                  24.88
                                               8.35
1 -----
2
3
 PLAS6330I 05/01/2000
4
                                 Rates
5 ST. LOUIS COUNTY (South of T 55N):
6
7 CEMENT MASONS (Treatment Plants) 21.34
                                               8.15
8
9
0
  PLAS6330J 05/01/2000
1
                                 Rates
                                               Fringes
2 HOUSTON & OLMSTED COUNTIES:
3
4 CEMENT MASONS (Treatment Plants): 23.29
                                        4.37
5
6
7
 PLAS6330K 05/01/2000
8
                                 Rates
9 ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT,
0
  SHERBURNE, WASHINGTON & WRIGHT COUNTIES:
1
2 CEMENT MASONS (Treatment Plants) 24.99
                                                7.96
3 -----
4
5
 PLAS6330L 05/01/2000
6
                                 Rates
                                              Fringes
7 ST. LOUIS COUNTY (North of T 55N):
8
 CEMENT MASONS (Treatment Plants) 18.20
9
                                               9.00
0
1
  PLAS6330M 05/01/2000
3
                                 Rates
                                               Fringes
4 ST. LOUIS COUNTY:
```

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6 7	PLASTERERS	19.62	8.70
901234567890123456789012345678901	PLAS6330N 06/01/2000 HOUSTON & OLMSTED COUNTIES:	Rates	Fringes
	PLASTERERS	25.25	2.40
	PLAS63300 05/01/2000 ST. LOUIS COUNTY (South of T 55N):	Rates	Fringes
	CEMENT MASONS (Heavy, Sewer & Water Lines)	20.33	10.70
	PLAS6330P 05/01/2000 ANOKA, CARVER, CHISAGO, DAKOTA, HENN SHERBURNE, WASHINGTON & WRIGHT COUN	EPIN, ISANTI,	
	CEMENT MASONS (Heavy, Sewer & Water Lines)	23.79	7.96
	PLAS6330Q 05/01/2000 ST. LOUIS COUNTY (North of T 55N):	Rates	Fringes
	CEMENT MASONS (Heavy, Sewer & Water Lines)	18.20	9.00
	PLAS6330R 05/01/2000 HOUSTON & OLMSTED COUNTIES:	Rates	Fringes
	CEMENT MASONS (Heavy, Sewer & Water Lines)	22.69	4.75
	PLAS6330U 07/01/1999 POLK COUNTY:	Rates	Fringes
2 3 4	CEMENT MASONS (Treatment Plants)		5.80
5 6 7 8 9 0 1 2 3 4 5 6 7 8	PLAS6330W 05/01/2000 BENTON, CLAY & POLK COUNTIES:	Rates	Fringes
	PLASTERERS	17.75	4.65
	PLUM0006E 08/01/2001 HOUSTON COUNTY:	Rates	Fringes
	PIPEFITTERS; PLUMBERS; & STEAMFITTER Mechanical Contracts Up to \$75,000.00	S: 22.93	8.35

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```
All Other Mechanical Contracts 28.66
                                                  8.35
2 OLMSTED COUNTY:
3
4 PIPEFITTERS; PLUMBERS; &
5
                                   22.93
                                           8.35
6
  STEAMFITTERS
7
 ______
8
9
 PLUM0011H 05/01/2001
0
                                   Rates
1 ST. LOUIS COUNTY (South of an east-west line drawn through
2
  Cotton)
3
4
 PLUMBERS, PIPEFITTERS,
5
                               26.35 9.15
  and STEAMFITTERS
6
7
8
  PLUM0015E 05/01/2001
                                   Rates Fringes
9
O ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (East of a line
1 running northeasterly from the point of Wright County that lies
2 furthest north to that point of Mille Lacs County that is south
3 by west) & WRIGHT COUNTIES:
4
5 PLUMBERS
                                   27.70 9.17+a
6
7 FOOTNOTE:
8
  a. Paid Holiday: Labor Day
9
0
1
 PLUM0015F 05/01/2001
2
                                   Rates
                                                Fringes
3 BENTON & STEARNS COUNTIES
4
5 PLUMBERS
                                   25.80 9.71+a
6
7 FOOTNOTE:
8
  a. Paid Holiday: Labor Day
9
0
1
 PLUM0034E 05/01/2001
2
                                   Rates
3 CHISAGO, DAKOTA, RAMSEY & WASHINGTON COUNTIES
4
                                   28.90
5
  PLUMBERS
                                                 9.68+a
6
7
  FOOTNOTE:
8
  a. 1 Paid Holiday: Labor Day
9
0
  PLUM0126E 11/01/2000
1
2
                                 Rates
                                                Fringes
3 CLAY & POLK COUNTIES:
4
5 PLUMBERS & STEAMFITTERS:
6
 Mechanical Projects, excluding
7
  Sheet Metal, Fire Protection &
8
  Pipe Insulation of Up to
  $2,000,000
9
                                   24.12 7.78
0
1 Mechanical Projects, excluding
2
3
   Sheet Metal, Fire Protection &
```

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```
Pipe Insulation of $2,000,000
  & above
5
                                 26.52 7.78
6
8
  PLUM0417B 06/01/2001
                           Rates Fringes
9
 ANOKA, DAKOTA, HENNEPIN, RAMSEY, SCOTT & WASHINGTON COUNTIES:
0
1
2 SPRINKLER FITTERS
                                  29.42
                                               11.17+a
3
4 FOOTNOTE:
5
  a. 6 Paid Holidays: Memorial Day; July 4th; Friday before
  Labor Day; Labor Day; Columbus Day; & Thanksgiving Day
6
7
8
9
 PLUM0455F 05/01/2001
0
                                 Rates
1 CHISAGO, DAKOTA, RAMSEY & WASHINGTON COUNTIES
2.
3
 PIPEFITTERS & STEAMFITTERS
                                 29.10
                                         10.10
4
5
6
  PLUM0539G 05/01/2001
7
                                 Rates Fringes
8 ANOKA, CARVER, HENNEPIN, ISANTI, SCOTT, SHERBURNE (East of a line
9 running North-Easterly from the point of Wright Co.that lies
O furthest North to that point of Mille Lacs that is South by West)
1 & WRIGHT COUNTIES:
2
3
                                  29.77 9.51
 PIPEFITTERS
4
5
6
  PLUM0539L 05/01/2001
                                 Rates Fringes
7
8 BENTON, SHERBURNE (West of a line running North-Easterly from
9
 point of Wright Co. lies furthest North to point of Mille Lacs
0
  that is South by West) & STEARNS COUNTIES:
1
2 PIPEFITTERS
                                  23.72
                                               11.83
3
 _____
4
5
 PLUM0589E 06/01/2001
                                 Rates
7 ST. LOUIS COUNTY (North of an East-West line drawn through
8 Cotton)
9
0
 PIPEFITTERS; PLUMBERS; &
                              23.62 11.42
1
  STEAMFITTERS
2
3
  ROOF0096U 06/01/1998
4
5
                                 Rates
                                              Fringes
6 ROOFERS:
7
  HOUSTON COUNTY
                                  16.01
                                               3.92
  OLMSTED COUNTY
                                                3.92
8
                                  17.34
9
0
1
2
  ROOF0096V 07/01/2000
                             Rates Fringes
3
4 ST. LOUIS COUNTY (South of Hwy 16, excluding city of Forbes):
5
6 ROOFERS
                                  22.20
                                               7.15
 ______
```

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```
8
 ROOF0096W 05/01/2000
0
                                                Fringes
                                  Rates
1 ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI (South of State
2
  Highway #95, including Cambridge), RAMSEY, SCOTT, WASHINGTON &
3
  WRIGHT (South of County Road #39) COUNTIES:
4
5 ROOFERS
                                24.94 7.63+a
6
7 FOOTNOTE:
8
  a. 1 Paid Holiday: Labor Day
9
0
1
  ROOF0096X 06/01/2000
2
                                  Rates
                                                Fringes
3 BENTON, ISANTI (North of State Highway #95, excluding Cambridge), 4 SHERBURNE, STEARNS & WRIGHT (North of Wright County Road #39,
  from South Haven to Monticello, including both towns) COUNTIES:
5
6
                                  21.50
7 ROOFERS
                                                5.45
8
9
0
  ROOF0096Y 05/01/2000
1
                                  Rates
                                         Fringes
2 ST. LOUIS COUNTY (Northern two-thirds):
3
4 ROOFERS
                                  18.20
                                          5.20
5
 ______
6
7
  ROOF0214B 04/01/1998
8
                                               Fringes
                                  Rates
9
 CLAY & POLK COUNTIES:
0
1 ROOFERS
                                  10.83
2 ------
3
4
  SFMN0669D 01/01/2002
                                  Rates Fringes
5
6 BENTON, CARVER, CHISAGO, CLAY, HOUSTON, ISANTI, OLMSTED, POLK, 7 SHERBURNE, ST. I
8
9
 SPRINKLER FITTERS
                                   26.36
                                                8.05
0
 ______
1
2
 SHEE0010U 05/01/2001
3
                                  Rates
4 BENTON, SHERBURNE & STEARNS COUNTIES
5
                                  24.91
6
  SHEET METAL WORKERS
7
8
9
  SHEE0010V 06/01/2001
0
                                  Rates
                                                Fringes
1 CLAY COUNTY
2
                                  18.94
3
  SHEET METAL WORKERS
                                                6.39
4 -----
5
 SHEE0010W 05/01/2000
6
7
                                  Rates
8 ST. LOUIS COUNTY (Southern one-third):
O SHEET METAL WORKERS
                                  24.28
                                               9.88
1
2
```

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```
3
  SHEE0010X 05/01/2001
                                     Rates Fringes
5 ST. LOUIS COUNTY (Northern two-thirds)
6
7
                                      24.83
  SHEET METAL WORKERS
8
9
0
  SHEE0010Y 05/01/2001
1
                                     Rates
2 ANOKA, CARVER, CHISAGO, DAKOTA, HENNEPIN, ISANTI, RAMSEY, SCOTT,
3
  WASHINGTON & WRIGHT COUNTIES
4
5
  SHEET METAL WORKERS
                                     28.26
                                                     10.68+a
6
7
  FOOTNOTE:
8
  a. Paid Holiday: Labor Day
9
0
1
  SHEE0010Z 05/01/2001
2
                                     Rates
                                                    Fringes
3 OLMSTED COUNTY
4
                                     25.11
                                             8.72
5
  SHEET METAL WORKERS
6
7
8
  SHEE1000A 05/01/1999
9
                                     Rates
                                                     Fringes
0 HOUSTON COUNTY:
1
2 SHEET METAL WORKERS:
3
  Sheet Metal Installations of
                                            6.49
4
  $50,000.00 & Under
                                     17.53
                                     19.69
5
  All Other Work
                                                    6.49
6
7
8
  SHEE1000E 06/01/2001
9
                                     Rates
                                                   Fringes
0 CLAY COUNTY
1
                                     19.79
2
  SHEET METAL WORKERS
                                                    6.05
3
4
5
  TEAM0132F 05/01/2000
                                                     Fringes
6
                                     Rates
7 CHISAGO (Northern half) & ISANTI COUNTIES:
8
9
 TRUCK DRIVERS (Treatment Plants) 23.08
0
1
2
  TEAM0160I 05/01/2000
3
                                     Rates
4 TRUCK DRIVERS (Heavy, Sewer & Water Lines):
5
 ANOKA, CARVER, CHISAGO (S. of T. 34-N), DAKOTA, HENNEPIN, RAMSEY,
6
7
  ST. LOUIS, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:
8
9
                                      19.80
  GROUP 1
                                                     5.70
                                      19.25
                                                     5.70
0
  GROUP 2
1
  GROUP 3
                                      19.15
                                                     5.70
2
  GROUP 4
                                      18.90
4 BENTON, CHISAGO (N. of T. 34-N), CLAY, ISANTI, POLK & STEARNS
5 COUNTIES:
```

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```
7
  GROUP 1
                                    16.32
                                                  5.70
                                    15.81
                                                 5.70
8 GROUP 2
                                    15.66
9 GROUP 3
                                                 5.70
0 GROUP 4
                                    15.66
                                                  5.70
1
2 HOUSTON & OLMSTED COUNTIES:
3
                                           5.70
4
                                    18.00
  GROUP 1
5
  GROUP 2
                                    17.45
                                                 5.70
                                                 5.70
6
  GROUP 3
                                    17.35
7
  GROUP 4
                                    17.15
                                                 5.70
8
9
        TRUCK DRIVER CLASSIFICATIONS
0
1
  GROUP 1 - Boom; Mechanic; Off-Road, including Articulated Dump
2
  Truck; Tractor Trailer; Truck Driver (Operation of Hand & Power
3
   Operated Winch); & Winches
4
5
  GROUP 2 - Tri Axles (Including Four Axles)
6
7
  GROUP 3 - Bituminous Distributor; Bituminous Distributor (One
8
  man operation); Tandem Axles; & Single Axles
9
0 GROUP 4 - Bituminous Distributor Spray Operator (Rear End
  Oiler); Dumpman; Pilot Car; Self-propelled Packer; Slurry
1
   Operator; Tank Truck Tender (Gas, Oil, Road Oil & Water);
2
3
   Tractor Operator (Wheel type used for any purpose)
4
5
  THE FOLLOWING CLASSIFICATIONS SHALL COME UNDER THE APPROPRIATE
6
  AXLE RATE WAGE GROUP:
7
   "A" Frame; Dry Batch Hauler; Ready-Mix Concrete; Slurry;
8
9
  Tank (Gas, Oil, Road Oil & Water)
0 -----
1
2
  TEAM0221D 05/30/1998
3
                                  Rates
4 LANDSCAPE - SOD, TREES, SHRUBS & BLACK DIRT:
                                                 4.00
5
  Single Axles & Farm Tractors 12.15
                                   12.30
6
                                                  4.00
  Tandem Axles
                                   12.45
7
  Truck-Train Combination
                                                  4.00
8 -----
9
0 TEAM0346D 05/01/1998
1
                                   Rates
                                                 Fringes
2 ANOKA, CARVER, CHISAGO (Southern half), DAKOTA, HENNEPIN, RAMSEY,
3
  ST. LOUIS, SCOTT, SHERBURNE, WASHINGTON & WRIGHT COUNTIES:
4
5 TRUCK DRIVERS (Treatment Plants):
6 GROUP 1 - Boom Truck Operator 19.55 4.50
7
  GROUP 2 - Ready-Mix; Tractor-Trailer 19.00
                                                  4.50
8
 GROUP 3 - Mechanic; Fork Lift
  Operator; & Tandem or 3 Axles 18.90
9
                                             4.50
0 GROUP 4 - Farm Tractor; Single or
                                   18.65
1 2 Axles; & Dumps
                                           4.50
2 ------
3
4
 TEAM0405C 05/01/1999
5
                                  Rates Fringes
6 HOUSTON COUNTY
 TRUCK DRIVERS (Treatment Plants) 15.49
8
0 OLMSTED COUNTY
```

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```
1
 TRUCK DRIVERS (Treatment Plants) 16.94
4
5
  TEAM0563C 05/01/1999
                                 Rates Fringes
6
7 BENTON, CLAY (Except City limits of Moorhead) & STEARNS COUNTIES:
8
9 TRUCK DRIVERS (Treatment Plants):
O Total Construction Projects of
1
  Over $950,000.00
2
 Total Construction Projects
                                  13.84
3
  Under $950,000.00
4 -----
5
6
 TEAM0580C 04/19/1999
                                  Rates
8 CLAY (Moorhead) & POLK (East Grand Forks) COUNTIES:
9
0 TRUCK DRIVERS (Treatment Plants) 14.05
1 -----
2
3
 TEAM1097B 05/01/1999
                                  Rates
4
                                               Fringes
5 POLK COUNTY (Excluding the city limits of East Grand Forks):
6
7 TRUCK DRIVERS (Treatment Plants):
8 Under $760,000.00, including
9
  Mechanical & Electrical
0
1 $760,000.00 & Over, including
2 Mechanical & Electrical
                                  13.95
3 -----
4
5 WELDERS - Receive rate prescribed for craft performing operation
6 to which welding is incidental.
8
9 Unlisted classifications needed for work not included within
O the scope of the classifications listed may be added after
1 award only as provided in the labor standards contract clauses
2 (29 CFR 5.5(a)(1)(v)).
3 ------
4 In the listing above, the "SU" designation means that rates
5 listed under that identifier do not reflect collectively
6 bargained wage and fringe benefit rates. Other designations
7 indicate unions whose rates have been determined to be
8 prevailing.
9
0
      WAGE DETERMINATION APPEALS PROCESS
1
2 1.) Has there been an initial decision in the matter? This can
3
 be:
4
5 * an existing published wage determination
6 * a survey underlying a wage determination
7 * a Wage and Hour Division letter setting forth a
  position on a wage determination matter
9 * a conformance (additional classification and rate)
  ruling
2 On survey related matters, initial contact, including requests
3 for summaries of surveys, should be with the Wage and Hour
4 Regional Office for the area in which the survey was conducted
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5 because those Regional Offices have responsibility for the
6 Davis-Bacon survey program. If the response from this initial 7 contact is not satisfactory, then the process described in 2.)
8 and 3.) should be followed.
0 With regard to any other matter not yet ripe for the formal
1 process described here, initial contact should be with the Branch
2 of Construction Wage Determinations. Write to:
4
       Branch of Construction Wage Determinations
5
       Wage and Hour Division
6
       U. S. Department of Labor
       200 Constitution Avenue, N. W.
7
8
       Washington, D. C. 20210
0 2.) If the answer to the question in 1.) is yes, then an
1 interested party (those affected by the action) can request
2 review and reconsideration from the Wage and Hour Administrator
3 (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:
5
            Wage and Hour Administrator
6
            U.S. Department of Labor
7
            200 Constitution Avenue, N. W.
8
            Washington, D. C. 20210
9
0 The request should be accompanied by a full statement of the
1 interested party's position and by any information (wage payment
2 data, project description, area practice material, etc.) that the
3 requestor considers relevant to the issue.
5 3.) If the decision of the Administrator is not favorable, an
6 interested party may appeal directly to the Administrative Review
7 Board (formerly the Wage Appeals Board). Write to:
9
            Administrative Review Board
0
            U. S. Department of Labor
1
            200 Constitution Avenue, N. W.
2
            Washington, D. C. 20210
4 4.) All decisions by the Administrative Review Board are final.
              END OF GENERAL DECISION
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General Decision Number ND020014

General Decision Number ND020014 Superseded General Decision No. ND010014 State: North Dakota Construction Type: HEAVY County(ies): GRAND FORKS CASS BURLEIGH HEAVY CONSTRUCTION PROJECTS (Excluding Sewer & Water Line Construction & Drainage Projects) Modification Number Publication Date 03/01/2002 COUNTY(ies): GRAND FORKS CASS BURLEIGH MORTON ELEC0714I 01/01/2001 Rates Fringes BURLEIGH AND MORTON COUNTIES: ELECTRICIANS: ELECTRICIAN 23.45 10.5%+a CABLE SPLICER 23.85 10.5%+a FOOTNOTE; a. \$5.20 per hour. ELEC14260 01/01/2000 Rates Fringes CASS AND **GRAND FORKS** COUNTIES: WIREMAN 18.94 4.28+11.5% 4.28+11.5% CABLE SPLICER 19.89 ______ SUND2006A 05/04/2000 Rates Fringes LABORERS: 9.92 Common Pipelayers 12.00 PAINTER: Brush, Roller, & Spray 17.00 POWER EQUIPMENT OPERATORS: 15.74 4.84 Backhoe Bobcat 12.60 4.50 Bulldozer 14.41 4.50 Crane 13.29 3.42 Front End Loader 14.93 Motor Grader 18.10 16.13 Scraper 12.13 Tractor TRUCK DRIVER: 8.50 Dump Tamdem/Semi 15.77 WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental. ______ Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

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In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

- 1.) Has there been an initial decision in the matter? This can be:
- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations

Wage and Hour Division

U. S. Department of Labor

200 Constitution Avenue, N. W.

Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor

200 Constitution Avenue, N. W.

Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board

U. S. Department of Labor

200 Constitution Avenue, N. W.

Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final. END OF GENERAL DECISION

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SECTION 00830

ATTACHMENT 2

MATERIAL SOURCES

Material Sources

Fine Concrete Aggregate

Forester Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491

Trail Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491

Anderson Pit Bradshaw Gravel Supply

T 138 N, R 41 W (Strata Corp.) (701) 746-7491

Loeffler Pit Loeffler Concrete & Gravel T 160 N, R 46 W (218) 265-2676

Coarse Concrete Aggregate

J & S Gravel Pit Northern Paving Co. (218) 281-5101

(701) 746-7491

Trail Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491

Anderson Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491

Loeffler Pit Loeffler Concrete & Gravel T 160 N, R 46 W (218) 265-2676

Riprap and Bedding

Trail Pit Bradshaw Gravel Supply (Strata Corp.) (701) 746-7491

Sec. 29 & N 1/2 Sec. 32 T 160 N, R 46 W Kittson County, MN

Sec. 25 T 150 N, R 40 W Polk County, MN

Sec. 6 and Sec. 31 Becker County, MN

E 1/2, Sec. 17 Kittson County, MN

SE 1/4, Sec. 30 T 150 N, R 44 W Red Lake County, MN

Forester Pit Sec. 29 & N 1/2 Sec. 32 Bradshaw Gravel Supply T 160 N, R 46 W (Strata Corp.) Kittson County, MN

Sec. 25 T 150 N, R 40 W Polk County, MN

Sec. 6 & Sec. 31 T 138 N, R 41 W Becker County, MN

E 1/2, Sec. 17 Kittson County, MN

Sec. 25

T 150 N, R 40 W Polk County, MN

Dave Dunham Pit	Sections 28 and 29
Felton, MN	T 142 N, R 45 W
(218) 494-3360	Clay County, MN

Aggregate Industries, Inc.	W $1/2$ Sec. 32
(Formerly CAMAS Kost Division)	T 142 N, R 45 W
Box 1036	Clay County, MN
Moorhead, MN	
(218)236-9640	

Southerland Quarry	NW $1/4$, SW $1/4$, Sec. 6
Bradshaw Gravel Supply	T 162 N, R 34 W
(Strata Corp.)	Lake of the Woods County, MN
(701) 746-7491	

Meridian Aggregate Co.	SE $1/4$, Sec. 18
Box 69	T 124 N, R 28 W
St. Cloud, MN	Stearns County, MN
(320) 251-7141	

Meridian Aggregate Co.	Sections 28, 29, 32, 33
200 14th Street	T 116 N, R 39 W
Granite Falls, MN	Yellow Medicine County, MN
(320) 564-2125	

Ortonville Stone Co.	SW 1/4, Sec. 26
Box 67	T 121 N, R 46 W
Ortonville, MN	Big Stone County, MN
(320) 839-6131	

(NOTE: The Contractor may utilize off-site fieldstone from surrounding farm fields along with cobbles and boulders from sand and gravel operations in the surrounding area if such materials can be processed to meet the applicable contract requirements.

SECTION 00830

ATTACHMENT 3

BNSF RAILROAD AGREEMENT

CONTRACTOR'S RIGHT OF ENTRY AGREEMENT FOR CONSTRUCTION PROJECTS ON PROPERTY OF THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY

Gentlemen:

Accordingly, as one of the inducements to and as part of the consideration for Railway granting permission to Contractor to enter upon Railway Property, Contractor, effective on the date of the execution of this Agreement by the Contractor, has agreed and does hereby agree with Railway as follows:

SECTION 1. RELEASE OF LIABILITY AND INDEMNITY

- (a) Contractor agrees to release Railway from any claims arising from the performance of the Work which Contractor has against Railway, except to the extent that such claims are proximately caused by the intentional misconduct or gross negligence of Railway.
- (b) Contractor shall indemnify and hold harmless Railway for all judgments, awards, claims, demands, and expenses (including attorney's fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's, or any of Contractor's subcontractors', acts or omissions in performing the Work or their failure to perform any obligation under this Agreement, but only to the extent that such injury or damage is caused by the acts or omissions of the Contractor, its subcontractors, or their employees.
- (c) THE INDEMNIFICATION OBLIGATIONS ASSUMED BY CONTRACTOR SHALL INCLUDE ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYER'S LIABILITY ACT AND CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE BOILER INSPECTION ACT, WHENEVER SO CLAIMED.
- (d) The Contractor shall reimburse the Railway for any and all costs incurred by the Railway in defending itself from any claim made against the Railway on account of any liabilities assumed by the Contractor in (a), (b), and (c) above. For purposes of this paragraph, the "costs of defense" are all costs reasonably incurred by the Railway in defending itself from any administrative or judicial claim described above. The "costs of defense" include, but are not limited to, the costs of investigation, attorney's fees, paralegal and other support staff, filing fees and conducting and responding to discovery.
- (e) Tendered Defense. If a claim is made against the Railway with respect to any of the liabilities undertaken by the Contractor in subparagraphs (a), (b), (c) or (d) above, the Railway may, at its option and by written notice to the Contractor, tender the defense of that claim to the Contractor. The Contractor shall, at its own expense, indemnify the Railway from any cost, payment or judgment to the extent required by (a), (b), (c) or (d) above and defend, settle or adjust any such claims to their conclusion. For purposes of this subparagraph, the term "claim" includes, without limitation, a demand, administrative action, subrogation claim, or suit brought against the Railway in any court, regardless of the relief requested. If a suit is brought against the Railway, the Railway may, at its option, forward the summons, complaint and associated process to the Contractor; the Contractor shall, at its own expense, appear and defend that suit in the name of

the Railway and indemnify the Railway from any cost, payment or judgment to the extent required by (a), (b), (c) or (d) above. This subparagraph implements subparagraphs (a), (b), (c) and (d) above and in no way adds to or diminishes the liabilities assumed by the Contractor under those subparagraphs.

(f) It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement shall survive any termination of this Agreement.

SECTION 2. INSURANCE.

- (a). Before commencing any Work, Contractor must provide (and maintain in effect as provided in subparagraph (f) of this Section) insurance, at Contractor's expense, covering all of the work and services to be performed hereunder by Contractor and each of its subcontractors, as described below:
 - (1). Workers' Compensation coverage as is required by State law.
- (2). Commercial General Liability insurance covering liability including, but not limited to, Public Liability, Personal Injury, Property Damage and Contractual Liability covering the obligations assumed by Contractor in Section 1, with coverage of at least \$2,000,000 per occurrence and \$4,000,000 in the aggregate. The X, C, and U exclusions must be removed from the policy.
- (3). Automobile Liability insurance, including bodily injury and property damage, with coverage of at least \$1,000,000 combined single limit or the equivalent covering any and all vehicles owned or hired by the Contractor and used in performing any of the services under this agreement.
- (4). Railroad Protective Liability insurance stating that The Burlington Northern and Santa Fe Railway Company is the Named Insured covering all of the liability assumed by the Contractor under the provisions of this Agreement with coverage of at least \$5,000,000 per occurrence and \$10,000,000 in the aggregate. Coverage shall be issued on a standard ISO form CG 00 35 01 96 and endorsed to include ISO form CG 28 31 10 93 and the Limited Seepage and Pollution Endorsement (see attached copy).
 - (b). Intentionally omitted.
- (c). All insurance shall be placed with insurance companies licensed to do business in the States in which the Work is to be performed, and with a current Best's Insurance Guide Rating of A- and Class VII, or better.
- (d). In all cases except Workers' Compensation and Railroad Protective Liability coverage, the certificate of insurance must specifically state that <u>THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY IS AN ADDITIONAL INSURED</u>.
- (e) Any coverage afforded Railway, the Certificate Holder, as an Additional Insured shall apply as primary and not excess to any coverage issued in the name of Railway.
- (f). Such insurance shall be approved by the Railway before any work is performed on Railway's Property and shall be carried until all work required to be performed on or adjacent to Railway's Property under the terms of the contract is satisfactorily completed as determined by United States Army Corps of Engineers, and thereafter until all tools, equipment and materials not belonging to the Railway have been removed from Railway's Property and Railway Property is left in a clean and presentable condition. The insurance herein required shall be obtained by the Contractor and Contractor shall furnish Railway with an original certificate of insurance, signed by the insurance company or its authorized representative, evidencing the issuance of insurance coverage as prescribed in (a) 1, 2 and 3 above, plus the original Railroad Protective Liability insurance policy to:

Attention:

Engineering Services

The Burlington Northern and Santa Fe Railway Company

Insurance Approval
4515 Kansas Avenue

Kansas City, Kansas 66106

- (g). The certificate of insurance shall guarantee that the policies will not be amended, altered, modified or canceled in so far as the coverage contemplated hereunder is concerned, without at least thirty (30) days notice mailed by registered mail to Railway.
- (h). As between the Railway and the Contractor, the Contractor shall be responsible for paying all of the premiums for the insurance required by this Agreement and by the Contract.

It is further distinctly understood and agreed by the Contractor that its liability to the Railway herein under SECTION 1 will not in any way be limited to or affected by the amount of insurance obtained and carried by the Contractor in connection with said Contract.

SECTION 3. CONTRACTOR REQUIREMENTS

- (a). While on or about Railway Property, Contractor shall fully comply with Railway's "Contractor Requirements", attached hereto, including (but not limited to) clearance requirements and personal protective equipment requirements. Contractor shall be responsible for fully informing itself as to Railway "Contractor Requirements".
- (b). The Contractor shall insure that each person under its control or supervision (including employees of subcontractors) providing labor, material, supervision, or services connected with the Work shall attend a Safety Orientation session conducted or approved by Railway prior to entering Railway Property. Contractor shall contact Manger Public Projects, William D. Thomson, telephone (913) 551-4484 fax (913) 551-4285, at least thirty (30) calendar days in advance of its proposed entry on Railway Property to arrange the necessary safety orientation session(s).
- (c). Prior to entering Railway property, the Contractor shall prepare and implement a safety action plan acceptable to Railway. The Contractor shall submit the safety action plan for review to the Railway representatives listed below at least thirty (30) calendar days in advance of its proposed entry on Railway Property. Contractor shall audit its compliance with that plan during the course of its work. A copy of said plan and audit results shall be kept at the work site and shall be available for inspection by Railway at all reasonable times.

Attention:

Spencer Arndt, Asst. Dir. of Public Projects BNSF Railway 80 - 44th Avenue NE Minneapolis, MN 55421 Telephone 763-782-3478

Craig Kemmet, Roadmaster BNSF Railway 1796 Demers Ave. Grand Forks, ND 58203 Telephone 701-795-1252

SECTION 4. PROTECTION OF RAILWAY FACILITIES AND RAILWAY FLAGGER SERVICES

- (a). The Contractor shall give a minimum of at least thirty (30) calendar days notice to Craig Kemmet, the Railway's Roadmaster, at telephone (701) 795-1252, in advance of when flagging services will be required to bulletin the flagger's position and shall provide five (5) working days notice to the Roadmaster to abolish the position per union requirements.
- (b). Railway flagger and protective services and devices will be required and furnished when Contractor's work activities are located over or under of and within twenty-five (25) feet measured horizontally from center line of the nearest track and when cranes or similar equipment positioned outside of 25-foot horizontally from track center line that could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:

- (1). When in the opinion of the Railway's representative, it is necessary to safeguard Railway's Property, employees, trains, engines and facilities.
- (2). When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.
 - (3). When work in any way interferes with the safe operation of trains at timetable speeds.
- (4). When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.
- (5). Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.
- (c). Flagging services will be performed by qualified Railway flaggers. The estimated base cost per day for one (1) flagger is \$500.00/day which includes vacation allowance, paid holidays, Railway and Unemployment: Insurance, Public Liability and Property Damage Insurance, health and welfare benefits, transportation, meals, lodging and supervision, for an eight (8) hour basic day. Time and one-half or double time for overtime, rest days and holidays may be required. These rates are subject to any increases which may result from Railway Employees-Railway Management negotiations or which may be authorized by Federal authorities. The Contractor will be billed on actual costs in effect at time work is performed.
- (1). A flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railway's representative.
 - (2). Each time a flagger is called, the minimum period for billing shall be the eight (8) hour basic day.
- (3). The cost of flagger services provided by the Railway, when deemed necessary by the Railway's representative, will be borne by the Contractor.

SECTION 5. TRAIN DELAYS

No work performed by Contractor shall cause any interference with the constant, continuous and uninterrupted use of the tracks, property and facilities of the Railway, it's lessees, licensees or others, unless specifically permitted under this agreement, or specifically authorized in advance by the Railway Representative. Nothing shall be done or suffered to be done by the Contractor at any time that would in any manner impair the safety thereof. When not in use, Contractor's machinery and materials shall be kept at least 50 feet from the centerline of Railway's nearest track, and there shall be no vehicular crossings of Railway's track except at existing open public crossings.

Contractor shall be responsible to Railway, including its affiliated railway companies, and its tenants for damages for any unscheduled delay to freight or passenger trains that are caused by the Contractor's performance of the Work as follows:

(a). Train Delay Damages, Passenger Trains

- (1). Contractor will be billed and Contractor shall pay Railway within 30 days, as provided below, for the actual economic losses arising from loss of contractual incentive pay and bonuses, and contractual penalties resulting from passenger train delays, whether caused by Contractor or its subcontractors performing the Work. Railway agrees that it will not perform any act to unnecessarily cause passenger train delay.
- (2). Passenger trains operate under incentive/penalty contract with the Railway. Under these arrangements, if Railway does not meet its contract service commitment, Railway may suffer loss of performance or incentive pay or be subject to a penalty payment. Contractor shall be responsible for any passenger train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a passenger train delay caused by Contractor, or subcontractors.

- (3). As example, a passenger train arrives 30 minutes after its contract service commitments with the Railway and Railway is assessed damages per terms of the contract. Contractor, and/or it's subcontractors, caused a 29 minute delay to the passenger train and therefore the Contractor is not responsible for passenger train performance incentives, penalties or other contractual economic losses actually incurred by Railway.
- (4). As example, a passenger train arrives 30 minutes after its contract service commitment and Railway is assessed damages per terms of the contract. Contractor, and/or it's subcontractors, caused a 31 minute delay to the passenger train and therefore the Contractor is 100% responsible for any passenger train performance incentive, penalties or other contractual economic losses actually incurred by Railway.
- (5). The contractual relationship between Railway and its passenger customers is proprietary and confidential. In the event of a passenger train delay covered by this Agreement, Railway will share information relevant to any passenger train delay to the maximum extent consistent with Railway confidentiality obligations. Damage for passenger train delays for certain passenger trains could be as high as \$50,000.00 per passenger train.

(b). Train Delays Damages, Freight Trains

- (1). Contractor will be billed and Contractor shall pay Railway within 30 days, as provided herein, for the damages for freight train delays, whether caused by the Contractor or its subcontractors. The Contractor will be billed at a rate of \$1,000.00 per freight train hour for each freight train delayed as determined from Railway's records. Each delay may cause delays to more than one freight train at the same time. These rates will be updated annually and Contractor will be billed at rate per hour in effect at the time the delay occurred.
 - (c). Train Schedules at the Locations of the Work.
- (1). This Agreement authorizes the Contractor to perform work on Railway Property at the locations described in A and B below. The Railway warrants that the traffic listed for each location is the scheduled traffic for that particular line as of the scheduled traffic for that particular the actual traffic using the line at the time the Work is performed.
 - A. Milepost 3.2 on Line Segment 250. The average train traffic per 24-hour period on this route is 2 (two) freight trains at a timetable speed of $\frac{1}{2}$ MPH and $\frac{1}{2}$ (zero) passenger trains and $\frac{1}{2}$ switch engine movements.
 - B. Milepost 99.6 on Line Segment 249. The bridge and track at this location is not currently in use by the Railway and are to be removed by the Contractor under the Contract. Therefore, the average train traffic per 24-hour period on this route is Q (zero) freight trains and Q (zero) passenger trains and Q (zero) switch engine movements.

SECTION 6. GOVERNING LAW

This Agreement shall be construed and interpreted in accordance with and by the law of the State of North Dakota.

SECTION 7. ENTIRE AGREEMENT

This writing constitutes the entire agreement between the parties and no modifications shall be binding unless made in writing and signed by the parties.

Kindly acknowledge receipt of this letter by signing and returning to the undersigned two original copies of this letter, which, upon execution by Railway, shall constitute an Agreement between us.

Yours truly,

(Contractor)

The Burlington Northern and Santa Fe

Ву			Ву	
-,			(Title)	
(Title)		· · · · · · · · · · · · · · · · · · ·	Accepted thisday of	
Address				
City,	State,	Zip		

Railway Company

LIMITED SEEPAGE, POLLUTION AND CONTAMINATION COVERAGE ENDORSEMENT WORDING

In consideration of the premium charged it is understood and agreed that Exclusion f. of Coverage A. of this Policy shall not apply to the liability of the Insured resulting from seepage and/or pollution and/or contamination caused solely by:

- a) unintended fire, lightning or explosion: or
- b) a collision or overturning of a road vehicle: or
- c) a collision or overturning or derailment of a train.

Notwithstanding the foregoing it is agreed that the coverage provided by this Endorsement shall not apply to:

- 1. loss of, damage to or loss of use of property directly or indirectly resulting from sub-surface operations of the Insured, and/or removal of, loss of or damage to sub-surface oil, gas or any other substance;
- 2. any site or location used in whole or in part for the handling, processing, treatment, storage, disposal or dumping of any waste materials or substances;
- 3. the cost of evaluating and/or monitoring and/or controlling seeping and/or polluting and/or contaminating substances;
- 4. the cost of removing and/or nullifying and/or cleaning up seeping and/or polluting and /or contaminating substances on property at any time owned and/or leased and/or rented by the insured and/or under the control of the Insured.

Notwithstanding the foregoing, Item 1 does not apply to tunnels.

EXHIBIT C-1

CONTRACTOR REQUIREMENTS

1.01 General

- 1.01.01 Terms defined in the Agreement to which these Contractor Requirements are attached (the "Agreement") are used with the same meanings herein.
- 1.01.02 Contractor shall plan, schedule, and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.
- 1.01.03 Contractor's right to enter Railway Property is subject to the absolute right of Railway to cause Contractor's work on Railway Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to railroad operations, or to Railway's employees, operations, equipment, or property.
- 1.01.04 Contractor is responsible for identifying and complying with all federal, state, and local laws. Contractor shall be responsible for and indemnify and save Railway harmless from all fines or penalties imposed or assessed against Railway under federal, state, or local laws and which arise out of contractor's work.
- 1.01.05 Contractor shall notify Railway's Assistant director Public Projects, Spencer D. Arndt, at telephone number (763) 782-3478, fax (763) 782-3061, or e-mail spencer.arndt@bnsf.com, at least thirty (30) working days before commencing any work on Railway Property. Contractor's notification to Railway shall refer to Railway's file _ English Coulee Grand Forks. North Dakota
- Where work is to be performed over or in proximity to any track, and 1.01.06 where excavations, borings, cuts, or fills are to be made under or in proximity to any track, the Contractor shall furnish the Railway five sets of working drawings showing details of construction activities on and about Railway Property. (Railway has standards for determining what work is "in proximity" to tracks, and Contractor shall be responsible for familiarizing itself with those standards prior to commencing any work on or about Railway Property.) The working drawings shall include the proposed method of installation and removal of all falsework, shoring, and cribbing, together with two sets of structural calculations for all falsework, shoring, and cribbing. All calculations shall take into consideration railway surcharge loading and shall be designed to meet or exceed the American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations shall be certified by a registered professional engineer licensed to practice in the state in which the Project is located. Contractor shall not begin work until notified by Railway that the drawings and calculations have been approved. Contractor shall use lifting devices, such as cranes and/or winches, to place or to remove any falsework over Railway's tracks. In no case shall Contractor be relieved of responsibility for results obtained by the implementation of the approved drawings and

calculations. Railway's approval of the drawings and calculations shall not be construed or deemed to be a ratification of the drawings and calculations or an adoption by Railway of the drawings and calculations as its own.

1.02 Railway Requirements

1.02.01 Contractor shall take such protective measures as are necessary to keep Railway's facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from its operations (which, for the purposes of these Contractor Requirements, shall be deemed to include the operations of those providing work, services, or materials on Contractor's behalf). Any damage to Railway's facilities resulting from contractor's operations will be repaired or replaced by Railway and the coast of such repairs or replacement shall be paid for by Contractor.

1.02.02 Contractor shall notify Railway's Division Superintendent,, at (), fax (), or e-mail, and shall provide blasting plans to said Division Superintendent for review, at least seven (7) calendar oprior to conducting any blasting operations adjacent to or on Railway Property.		
1.02.03	Contractor shall abide by the following clearances during construction:	
. 25'	0" Horizontally from centerline of nearest track	

- Vertically above top of rail (note: the clearance for temporary 22'-0" falsework may be reduced to 21'-6" if such reduced clearance is approved in advance by Railway and by the state agency having jurisdiction thereof) Vertically above top of rail for electric wires carrying less than 750 27'-0" 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts Vertically above top of rail for electric wires carrying 15,000 volts 30'-0" to 20,000 volts 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts
- 1.02.04 Any proposed infringement of state statutory clearances relating to Contractor's operations (including the operations of those providing work, services, and materials for or on behalf of Contractor) shall be submitted to Railway and to the state agency (if any) having jurisdiction thereof and shall not be undertaken until approved in writing by Railway and authorized by said agency.
- 1.02.05 In the case of impaired vertical clearance above top of rail, Railway shall have the option of installing tell-tales or other protective devices Railway deems necessary for protection of railroad operations. The cost of tell-tales or protective devices shall be borne by Contractor.

- 1.02.06 Details of construction affecting Railway's property and tracks which are not included in the approved Project plans shall be submitted to Railway by Contractor for approval before work is undertaken, and the work shall not be undertaken until such items are approved by Railway. Railway's approval shall not be construed or deemed to be ratification of such items or an adoption by railway of such items as its own.
- 1.02.07 At other than public road crossings, Contractor shall not move any equipment or materials across Railway's tracks until permission has been obtained from Railway. Contractor must enter into a temporary private crossing agreement with Railway prior to moving equipment or materials across Railway' tracks. The temporary crossing shall be gated and locked at all times when not required for us by Contractor. The temporary crossing shall be at the expense of Contractor.
- 1.02.08 Discharge, disposal, release, or spillage on Railway property of any hazardous substances or hazardous waste is prohibited, and contractor shall immediately notify Railway's Resource Operations Center at 7-800-832-5452 1-800-832-5452 of any such disposal, discharge, release, or spillage. Contractor shall not allow Railway Property to become a treatment, storage, or disposal facility, as those terms are defined in the federal Resource Conservation and Recovery Act or any analogous North Dakota law.
- 1.02.09 Contractor, upon completion of the work, shall promptly remove from Railway Property all of Contractor's tools, equipment, implements, and other materials, whether brought upon said property by Contractor or by anyone providing work, services, or materials for or on behalf of Contractor, and shall cause the Railway Property to be left in a condition acceptable to Railway.

1.03 Contractor Safety Action Plan

- 1.03.01 Contractor shall develop and implement a safety action plan which shall b made available to Railway prior to commencement of any work on Railway Property. During the performance of the work, Contractor shall audit its compliance with the safety action plan. Contractor shall designate an on-site project supervisor who shall serve as the contact person for Railway and who shall maintain a copy of the safety action plan and audits at the job site for inspection and review by Railway at any time during the course of the Project. The safety action plan shall include, but not be limited to, the following:
 - ◆ Contractor's Employee Safety: Safety Orientation Job Briefings Personnel Protective Equipment Protection of Railway Facilities; Railway Flagger Services Protection of contract Employees Working Nearer Than 25 Feet from any Track Work After Hours

- Contractor Employee Training: Personal Injury Reporting Accident Investigation and Analysis
- High Risk Work Areas/Situations:
 Notification of Damage to Railway Property or Hazards That Could Affect the Safe Operation of Trains
 Falsework/Shoring Affecting the Integrity of Tracks
 Clearances Affecting the Integrity of Train Operations
 Moving Equipment and Materials Across Railroad Tracks
 Security of Machines, Equipment, and Vehicles
 Power Line Safety
 Excavation Safety
- High Risk Employees
 Alcohol and Drug Use
 Firearms or Deadly Weapons
- Property Damage, Housekeeping and Clean-up
- Storage of Materials
- Facility Auditing
- Compliance with Laws
- Hazardous Substances and Materials:
 Discharges, Releases, and Spills
 Hazardous Materials Encountered in Excavations

1.04 Contractor General Safety Requirements

- 1.04.01 Work in proximity to railroad tracks is potentially hazardous, because movement of trains and equipment can occur at any time and in any direction. All work performed by Contractor (or those providing work, services, or materials on its behalf) within twenty-five (25) feet of any track shall be in compliance with the Federal Railroad Administration's roadway worker protection regulations.
- 1.04.02 Before beginning any task on Railway Property, a thorough job safety briefing shall be conducted with a all personnel involved with the task, and the briefing shall be repeated when the personnel or task changes. If the task is within twenty-five (25) feet of any track, the job briefing must include Railway's flagger and the procedures contractor will use to protect its employees, subcontractors, agents, and invitees when moving any equipment adjacent to or across any railroad track.
- 1.04.03 Workers shall not work nearer than twenty-five (25) feet to the centerline of any track without proper flag/work protection provided by Railway, unless the track is protected by track bulletin and work has been authorized by Railway. If flag/work protection is provided, all personnel must know: (1) who Railway's flagger is, and how to contact the flagger, 92) the limits of the flag/work protection, (3) the method of

communication to stop and resume work, and (4) the procedure for entry into designated flag/work limits. Personnel entering flag/work limits that were not previously job briefed must notify the flagger immediately and must be given a job briefing if working at less than twenty-five (25) feet from centerline of track.

- 1.04.04 When employees of contractor (or employees of those providing work, services, or materials for or on behalf of contractor) are required to be present on Railway Property after normal working hours or on weekends, Railway's representative must be notified. A minimum of two such employees shall be present during such times.
- 1.04.05 If any employee of Contractor (or employee of those providing work, services, or materials for or on behalf of Contractor) is suspected by Contractor or Railway of being under the influence of drugs or alcohol, or in possession of same, such employee will be removed from Railway Property and thereafter released to the custody of a representative of Contractor's management. Future access to Railway Property by that employee will be denied.
- 1.04.06 Any damage to Railway's property or facilities, and any hazard noticed on passing trains, shall be reported immediately to Railway's representative. Any time a vehicle or machine comes in contact with a track, signal equipment, or structure (e.g., bridge) a train derailment could result, and such contact must therefore be reported by the quickest means possible to Railway's representative and to Railway's Resource Operations Center at 1-800-832-5452.
- 1.04.07 Local emergency numbers shall be obtained prior to the start of any work and shall be posted at the job site.
- 1.04.08 All persons are prohibited from having any pocket knife with a blade in excess of three (3) inches, or any firearm or other deadly weapon, in their possession while on Railway Property.
- 1.04.09 All personnel protective equipment used on Railway Property shall meet applicable OSHA and ANSI specifications and Railway's requirements. Railway's personnel protective equipment requirements are:
 - Safety glasses: permanently affixed side shields; no yellow lenses
 - Hard hats with high visibility orange cover
 - Safety shoes: hardened toe, above-the-ankle lace-up with a defined heel
 - High visibility retro-reflective orange vests

Hearing protection, fall protection, and respirators will be worn as required by state and federal regulations.

1.04.10 Contractor shall not pile or store any materials, machinery, or equipment within twenty-five (25) feet of the centerline of the nearest track. At highway/rail atgrade crossings, materials, machinery, and equipment shall not be stored or left

temporarily in such manner as to interfere with the sight distances of motorists approaching the crossing. Prior to beginning work, Contractor will establish a storage area with the concurrence of Railway's representative.

- 1.04.11 machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set, and if equipped with blade, pan, or bucket, same must be lowered to the ground. All machinery and equipment left unattended on Railway Property must be left inoperable and secured against movement.
- 1.04.12 workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water shall comply with all federal, state, and local laws.
- 1.04.13 All power line wires must be considered dangerous and of high voltage unless Contractor is informed to the contrary by proper authority. For all power lines, the minimum clearance between the lines and any part of the equipment or load shall be as follows:
 - ◆ 200 KV or below 15 feet
 - ◆ 200 to 350 KV 20 feet
 - ◆ 350 to 500 KV 25 feet
 - ◆ 500 to 700 KV 35 feet
 - 750 to 1000 KV − 45 feet
 - ◆ Capacity of line not known 45 feet

A person shall be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an equipment operator to maintain the desired clearance by visual means.

1.05 Excavation

- 1.05.01 Before excavating, contractor must ascertain if there are any underground pipe lines, electric wires, or cables, including fiber optic cable systems, located within the Project work are. Excavating on Railway Property could result in damage to buried cables, resulting in delay to railroad traffic or disruption of service to users of the cables, which in turn can cause business interruptions involving loss of revenue and profits. Before any excavation commences, Contractor must contact Railway's signal Supervisor and Roadmaster. All underground and overhead wires must be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of same. It is also Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.
- 1.05.02 Contractor must cease work in the affected area and Railway must be notified immediately if unexpected or unidentified obstructions are encountered during

excavation work. If the obstruction is a utility, and the owner of the utility can be identified, then Contractor must notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work will be performed until the exact location has been determined. There will be no exceptions to this requirement.

- 1.05.03 All excavations shall be conducted in compliance with applicable OSHA regulations and, regardless of depth, shall be shored where there is any danger to tracks, structures, or personnel.
- 1.05.04 Any excavations, holes, or trenches on Railway Property must be covered, guarded, and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from hazards. All excavations must be back-filled as soon as possible.
- 1.06 Hazardous Waste, Substances, and Materials Reporting
- 1.06.01 If Contractor discovers any hazardous waste, hazardous substance, hazardous material, petroleum, or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway Property, or in or near any surface water, swamp, wetland, or waterway, while performing any work on the Project, Contractor shall immediately: (a) notify Railway's Resource Operations center at 1-800-832-5452 of such discovery; (b) notify any federal, state, or local agency as required by law; (c) take safeguards necessary to protect on-site personnel and the general public; and (d) exercise due care with respect to such material, including the taking of any appropriate measure to minimize the impact of the release, discharge, or spillage of such material.

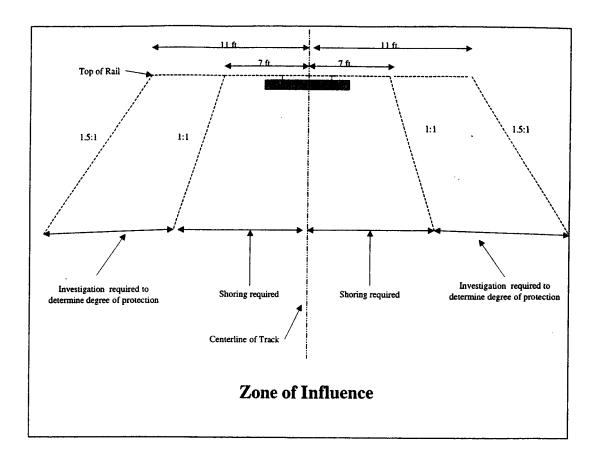
1.07 Personal Injury Reporting

Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration reporting requirements. Any personal injury sustained by any employee of Contractor (or any employee of those providing work, services, or materials on Contractor's behalf) while on Railway Property must be reported immediately (by phone mail if unable to contact in person) to Railway's representative. Railway's Non-Employee Personal Injury data collection form must be completed and sent by fax to Railway at (817) 352-7595, to Railway's roadmaster at fax (___) ____ and to Railway's representative at fax (___) ____, no later than the close of shift on the date of the injury. Prior to commencing any work on the Project, contractor must obtain Railway's then-current Non-Employee Personal Injury data collection form and must at all times have copies of that form available at the Project work site.

SECTION 00830

ATTACHMENT 4

BNSF EARTHWORK ZONE OF INFLUENCE FIGURE



SECTION 00830

ATTACHMENT 5

ABANDONED WATER TREATMENT PLANT CLEAN UP LETTER

Stigsell Environmental 34 Morningside Rd St. Cloud, MN 56303 320-230-9985

March 25, 2002

City of East Grand Forks Tom Spoor 1421 Demers Ave. East Grand Forks, MN 56721

Dear Tom:

We have completed the clean up of asbestos and removal of hazardous materials at the old Water Treatment Plant located at 580 Second Ave. N.E. in the City of East Grand Forks.

Materials removed included asbestos from an old boiler, pipe lagging and elbows on connecting pipes and other pipe laggings scattered about the floor area.

Fluorescent bulbs and PCB ballast were removed from light fixtures and various pails of hazardous materials.

Upon completion we did a final air clearance and re-inspection for materials and found the building to be ready for demolition.

If I can be of further assistance please feel free to contact me.

Sincerely,

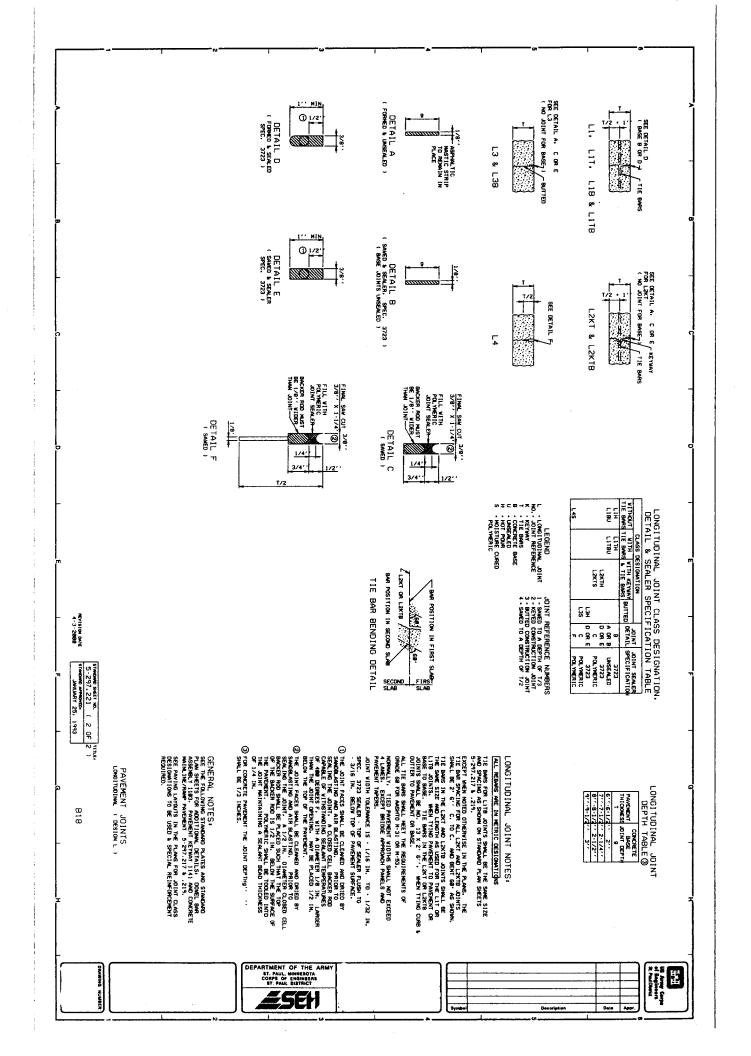
Tom Stigsell

SECTION 00830

ATTACHMENT 5

MNDOT STANDARD SHEET 5-297-.221 - PAVEMENT JOINTS

-- End of Section --



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SECTION 01000

GENERAL

06/02

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

The work of this contract includes, but is not limited to, construction of levees, pump station, storm sewer systems, bituminous roads and trails, park shelter, restroom facility, and other recreational features.

1.2 ORGANIZATION OF SPECIFICATIONS

The specifications which govern the materials and equipment to be furnished and the work to be performed under this contract are listed in the Table of Contents. No attempt has been made in the specifications to segregate work to be performed by any trade, craft, or subcontractor. Any segregation between the trades or crafts shall be solely a matter for agreement between the Contractor, Contractor's employees, and subcontractors.

1.3 REFERENCES

Reference to the standards, specifications, or codes of any technical society, organization, or association, or local, state, or Federal authority shall mean the specific edition or revision listed.

1.4 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-04 Drawings

Utility As-Builts; FIO

The Utility As-Builts are described under PARAGRAPH: SURVEYS.

SD-08 Statements

Dewatering Plan; FIO

The submittal requirements are as described in PARAGRAPH: DEWATERING OPERATIONS.

Shoring plan; FIO.

The submittal requirements are described in PARAGRAPH: SHORING.

Haul Route Permits; FIO.

The submittal requirements are described in PARAGRAPH: HAUL ROUTES.

Utility Service Interruption Request; GA.

Submit request to interrupt utilities as described in PARAGRAPH: INTERRUPTION OF SERVICES.

Traffic Control Plan; GA

A traffic control plan shall be submitted as described in PARAGRAPH: ROADWAYS.

Levee Removal/Flood Protection Plan; GA

A plan for removal of levees and flood protection during construction operations shall be submitted as described in PARAGRAPH: LEVEE REMOVAL.

Railroad Stoplog Closure Work Plan; GA

A plan for construction of the stoplog closures on the BNSF railroad property shall be submitted as described in PARAGRAPH: RAILROADS.

MNDOT Permits; FIO

The Contractor shall provide copies of permits from MNDOT for working in MNDOT right-of-way as specified in PARAGRAPH: MNDOT RIGHT-OF-WAY.

SD-09 Reports

Preconstruction Damage Report; FIO

Preconstruction damage reports shall be submitted as described in PARAGRAPH: PRECONSTRUCTION DAMAGE SURVEY.

1.5 MEASUREMENT AND PAYMENT

The Contractor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract line items on the bidding schedule.

PART 2 PRODUCTS

2.1 APPROVAL OF MATERIALS OR ALTERNATES

Requests for approval of materials and products, or substitutes thereof, will not be considered prior to award of the contract.

2.2 WARRANTIES

Any items that are submitted for review or approval of the Contracting officer should include a copy of the manufacturer's standard warranty if one is available.

PART 3 EXECUTION

3.1 GROUNDS AND ROADWAYS

3.1.1 Availability of Grounds

The boundary limits of the grounds made available for the Contractor's use during the life of the contract are shown on the drawings. Any additional rights-of-entry or grounds desired by the Contractor shall be obtained by the Contractor at its own expense, and copies of agreements for the use of such rights-of-entry shall be furnished to the Contracting Officer before entering thereon. Such agreements shall clearly relieve the Government of any responsibility for damages resulting from the use of the grounds.

3.1.2 Drainage Facilities

Insofar as natural drainage from protected areas and agricultural fields is obstructed by contract operations, it shall be the Contractor's responsibility to make adequate provision for accommodating such drainage in a satisfactory manner during the life of this contract, either by temporary means or by use of the permanent construction and operation of the permanent facilities.

3.1.3 Roadways

3.1.3.1 Traffic Control Plan

A traffic control plan including, but not limited to, road closures, anticipated railroad crossing locations, detour drawings, traffic signage lists and locations, and a schedule of traffic modifications shall be submitted for approval. The traffic control plan shall be in accordance with the Minnesota Manual on Uniform Traffic Control Devices and the requirements of the Burlington Northern Santa Fe Railroad Company (BNSF Railroad Company). The Contractor shall coordinate with the City of East Grand Forks to determine restrictions on road closures and detours. The point of contact for the City of East Grand Forks is Mr. Greg Boppre of Floan-Sanders Engineering, (218) 773-1185. The Contractor shall coordinate with the BNSF Railroad Company for any restrictions for railroad crossings and for work within BNSF right of way. Known traffic restrictions are listed below:

1) Interruption of traffic on 2nd Street NE between approximate Station D150+00 to D193+00 in Reach 1 will not be allowed. Continuous access to the businesses and facilities along 2nd Street NE shall be maintained. The work required shall be staged as required to provide continuous access. A plan and schedule for construction on 2nd Street NE while maintaining continuous access shall be submitted for review and approval.

- 2) Continuous access shall be provided to the Murray Bridge on 2nd Avenue between The Point Area and East Grand Forks north of the Red Lake River. The work required to construct the storm sewer facilities and stoplog closure on 2nd Avenue shall be staged as required to provide continuous access. A temporary bypass constructed around the intersection of 2nd Street NE and 2nd Avenue will also be allowed. If selected, the bypass shall be paved with bituminous and have appropriate pavement markings.
- 3) Catfish Days will be held in the City of East Grand Forks on a Friday through Sunday in August 2002 and August 2003. The Contractor shall maintain access on Hill Street to the bituminous road and trail southeast of the stoplog closure structure on Hill Street in Reach 1 for public vehicle traffic and emergency vehicles during Catfish Days.

3.1.3.2 Traffic hazards

When continuous haul operations or other conditions created by the Contractor's operations result in interference or hazard to traffic on streets and highways or railroad tracks, the Contractor shall erect warning signs and provide flagging services as necessary to safeguard the public as required in SECTION 01500: TEMPORARY CONSTRUCTION FACILITIES. Flagging services for railroad crossings and work within railroad company right of way shall be obtained from the BNSF Railroad Company. Coordination of railroad flagging services shall be performed through the BNSF Railroad Company Roadmaster referenced in Paragraph: RAILROADS. The cost of flagging services, signage, or other traffic control facilities required shall be borne by the Contractor.

3.1.3.3 Haul routes

The Contractor shall be responsible for securing all permits required along haul routes. The Contractor shall be the sole permittee and shall be responsible for meeting all obligations of the permits. A copy of each permit shall be submitted to the Contracting Officer. The Contractor, as between the Government and the Contractor, has sole responsibility for damage or deterioration of the Contractor's haul routes. Dust control shall be provided as stated in SECTION 01410: ENVIRONMENTAL PROTECTION.

3.1.3.4 MNDOT Right-of-Way

The Contractor shall apply for and obtain permits for work being performed on MNDOT right-of-way. The Contractor shall provide a copy of the permits to the Contracting Officer as specified in the Clause: WORK IN MNDOT RIGHT-OF-WAY and shall comply with the requirements of the permits.

3.2 RAILROADS

The Contractor will be required to enter into an agreement with the Burlington Northern Santa Fe Railroad Company (BNSF Railroad Company) for work on BNSF Railroad Company right-of-way. A copy of the agreement is included in Section 00830. The Contractor shall provide insurance to meet the requirements of the railroad contract and shall pay the cost of flagging services, track removal and replacement services, and other

services provided by the BNSF Railroad Company as required by the agreement.

3.2.1 Railroad Stoplog Closure Structures

3.2.1.1 Division of Work Tasks

The BNSF Railroad Company will remove and replace the tracks, ties, and ballast required to construct the stoplog closures in accordance with the railroad agreement. The Contractor will be responsible for the remainder of the work on the stoplog closure structures and for coordinating the services provided by the BNSF Railroad Company.

3.2.1.2 Track Outages

- 1. The 3 railroad stoplog closures shall be constructed concurrently to minimize outage time of the BNSF Railroad Company tracks. One (1) 24-hour track outage will be allowed for construction of all three (3) railroad stoplog closures on BNSF Railroad Company property. The BNSF Railroad Company will require ten (10) of the twenty-four (24) hours to perform their work of removing and replacing rails, ties, and ballast. The BNSF Railroad Company will utilize three (3) crews, one (1) at each railroad stoplog closure, to perform their work concurrently. The Contractor shall perform the work required to construct all (3) railroad closures within BNSF Railroad Company property within one fourteen (14) hour period.
- 2. The Contractor's allotted time will begin after the railroad, upon request of the Contractor, completes the removal of the rail, ties, and ballast and turns the site over to the Contractor. The Contractor's work shall include, but not be limited to, excavation, placement of the closure footing and sill, furnish, backfill, placement, and compaction of subballast. After the Contractor completes this work to the satisfaction of the Contracting Officer and the BNSF Railroad Company and the Contractor turns the site ofver to the Railroad Company, the measurement of the allotted time will end. The BNSF Railroad Company will then place the ballast, ties, and rails and reopen the line to rail traffic.
- 3. If the Contractor has not completed the required work on the railroad stoplog closures within the fourteen (14) hour period, he will cause train delays. The Contractor will be required to pay the BNSF Railroad Company for train delays as indicated in the BNSF Railroad Agreement in Section 00830: ATTACHMENTS.
- 4. Advance notice shall be given to the Contracting Officer and the BNSF Railroad Company to schedule the dates of the outage for construction of the railroad stoplog closures. The BNSF Railroad Company will likely require that the work be performed on dates and at times that will be the least disruptive to their operations. The may require the Contractor to work at night, weekends, and/or holidays. At the time of advertising this contract, the BNSF Railroad Company has indicated their preference that the twenty-four (24) hour closure start at 4:00 a.m. on a Monday and end at 4:00 a.m. on a Tuesday.

- 5. The 24" RCP culvert in Reach 1 at approximately Station D245+00 shall be installed with the same outage as construction of the adjacent BNSF stoplog closure. A separate track outage for installation of the culvert and appurtenant items will not be allowed.
- 6. The Contractor shall protect utilities and equipment on the BNSF Railroad Company property including, but not limited to, communication, signal, and electric utilities that may be buried adjacent to the railroad tracks.

3.2.2 Railroad Point of Contact

Flagging services, track outages and work on the railroad property shall be coordinated with the BNSF Railroad Company contact listed below.

Craig Kemmet
Roadmaster, BNSF Railroad Company
1796 Demers Avenue
Grand Forks, ND 58203
Phone: (701) 795-1252
Fax: (701) 795-1275

3.2.3 Closure Construction Plan

A detailed plan for the construction of the portion of the closures within BNSF Railroad Company property shall be submitted for approval. This also includes all work within the "Zone of Influence" of active tracks. A description and sketch of the "Zone of Influence" is included in Section 00830: ATTACHMENTS. The Contracting Officer will coordinate review of the plan with the railroad company. The plan is to specifically address the intended procedure, manpower, available equipment, backup equipment, tools, construction joint locations, concrete mix designs, footing modifications, and temporary shoring or support of the railroad. A detailed time line by hour is to be provided that includes time for each of the Contractor's activities.

3.2.3.1 Concrete Footing Design Criteria

Concrete footings for the stoplog closures on BNSF railroad property may be backfilled and track replaced and train traffic resumed after the concrete has obtained a minimum compressive strength of 1,800 psi. Additional Portland cement can be added to obtain higher early strengths. Rapid cure or high early types of cement will not be permitted. Admixtures may be used to improve concrete workability and to accelerate the rate of cure.

3.3 DISPOSAL OF DEBRIS AND WASTE

The Contractor's attention is directed to SECTION 01410: ENVIRONMENTAL PROTECTION and to the following SECTION 00700: CONTRACT CLAUSES: PERMITS AND RESPONSIBILITIES; PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, EQUIPMENT, AND IMPROVEMENTS; OPERATIONS AND STORAGE AREAS; and CLEANING UP. Burning will not be permitted at the project site and debris or waste shall not be left on the site. Disposal of clearing and grubbing

debris shall be by the following method:

3.3.1 Disposal Offsite for Useful Purposes

In the interest of conservation, it is required that the Contractor make a reasonable effort to dispose of the material offsite for some useful purpose. Timber may be cut into convenient lengths and utilized for making saw logs, posts, cordwood, wood chips for paper making or other uses, or other similar use.

3.3.2 Disposal in a Locally-Operated Sanitary Landfill

Contractor shall select the disposal site with the approval of the Contracting Officer. The Contractor shall secure the required permits for disposal and provide copies of the permit to the Contracting Officer.

3.3.3 Disposal of Solid Construction Debris and Waste

Disposal of solid construction debris and waste shall consist of removal from Government property and disposal in compliance with federal, state and local requirements for solid waste disposal. Contractor shall select the disposal site with the approval of the Contracting Officer.

3.4 EXISTING UTILITIES

3.4.1 General

The Contractor shall coordinate all utility relocation requirements. The Contractor shall make payment to the utility companies for all services, fees, and permits required to relocate and reestablish service for utilities relocated for the convenience of the Contractor's operations. The Contractor shall be responsible for all costs related to protecting existing utilities.

3.4.1.1 Utility Relocations

The existing utilities to be removed or relocated by the Contractor are shown on the drawings. The City of East Grand Forks and private utility companies are responsible for removing and relocating other existing utilities that penetrate through or under the new levees and existing utilities that conflict with new facilities constructed under this contract. The Contractor shall coordinate with the City of East Grand Forks and the utility companies to ensure that relocation of the utilities is performed without causing delay to the project.

3.4.1.2 Utility Coordination Meetings

The City of East Grand Forks conducts weekly coordination meetings with utility companies that service the City. The Contractor shall participate in the weekly coordination meetings. The meetings are currently held each Tuesday morning at the City Hall in East Grand Forks, Minnesota. If necessary, the meeting date, time, and location may occasionally be changed due to conflicts, to other dates, times, and locations within the City of East Grand Forks.

3.4.2 Buried Utilities

The approximate locations of known existing buried utilities are shown on the drawings to the extent of available information at the time the drawings were prepared. In general, no service connections are shown. Prior to commencing excavation, the Contractor shall accurately locate all such installations. In the event the Contractor damages any existing utility lines, report thereof shall be made immediately to the Contracting Officer. If the Contracting Officer determines that repairs shall be made by the Contractor, such repairs shall be performed immediately. The costs associated with repairs shall be borne by the Contractor.

3.4.3 Interruption of Services

Utility services shall not be interrupted except for brief periods to facilitate cut-ins. The Contractor shall provide temporary service and shall relocate existing utilities as required to construct the work shown and insure uninterrupted service. If interruption of services is unavoidable, the Contractor shall request approval in writing at least 30-calendar days prior to the proposed interruption. This submittal shall fully describe all details of proposed interruption and the reasons why alternatives are not feasible. The Contractor shall further coordinate with the owner of the utility and notify affected consumers at least 10-calendar days in advance of interruption of services. The Contracting Officer will not in general approve proposals which require interruption of services for more than 4 continuous hours.

3.4.3.1 Sanitary Sewer Forcemains

Interruption of service of sanitary sewer forecemains will not be allowed.

3.4.4 Minnesota One Call Excavation Notice System

For contract work performed within the State of Minnesota, the Contractor shall meet the requirements of Minnesota Statutes, Chapter 216D "One Call Excavation Notice System." The Gopher State One Call notification center telephone numbers are:

Hotline: (651) 454-0002 Outstate: (800) 252-1166

3.5 SCHEDULING

3.5.1 General

It shall be the responsibility of the Contractor to schedule and execute the work, incorporating the necessary requirements set forth in these specifications. The Contractor shall develop and submit a schedule in accordance with SECTION 00800: SPECIAL CONTRACT REQUIREMENTS: SCHEDULES FOR CONSTRUCTION CONTRACTS.

3.5.1.1 Interim Completion Dates

Interim completion dates are not subject to adjustment. Modifications that affect the overall project completion date will not automatically change the interim completion dates accordingly. In the event that interim completion dates are not met, the Contractor shall be responsible for subsequent additional costs to this contract and for additional cost to related contracts by others.

3.5.2 Electrical Substation

Facilities are currently under construction by others that will replace the electrical substation in Reach 1 near Station D172+50 to D175+00 and an overhead electric transmission line leading to the substation. The electrical substation and overhead transmission line will be taken out of service in Summer 2002. The electrical substation and overhead transmission line shall not be removed and levees shall not be constructed in this area until after notice is given to the Contractor that the substation and overhead transmission line is no longer in service. Removal of the transmission line is specified in SECTION 16202: OVERHEAD ELECTRICAL TRANSMISSION SYSTEM REMOVAL. Removal of the electrical substation is specificed in SECTION 16203: ELECTRICAL SUBSTATION REMOVAL.

3.5.3 Notification

The Contractor shall inform the Government in writing within 5 days after receipt of notice to proceed and before work begins as to which hours of the day and days of the week work under this contract will be performed. The Contractor shall notify the Government at least 24 hours before work is to be conducted on overtime, in multiple shifts, on weekends, or on Federal Government holidays.

3.5.4 Work Hours

The City of East Grand Forks has a noise ordinance. In accordance with the noise ordinance, work at the project site shall not be performed earlier than 7:00 a.m. and not later than 10:00 p.m. except as noted for construction of the railroad stoplog closures on BNSF Railroad Company property.

3.6 CONSTRUCTION RESTRICTIONS

3.6.1 Blasting

Blasting will not be permitted.

3.6.2 Protection of Trees

Trees to be protected shall be determined and staked by the Contracting Officer. The following measures shall be implemented for tree protection and shall be addressed in the Environmental Protection Plan required under SECTION 01410:

- a. The trees shall be protected from wounds to the bark and foliage.
- b. The critical root zone shall be protected from compaction and

grading.

c. Changes in temporary site drainage and ponding shall be minimized to the extent possible that it effects the protected trees.

The critical root zone of trees designated to be protected shall be surrounded by a high visibility fence 4 feet in height, supplied and erected by the Contractor. The critical root zone shall be defined by an area extending 1.5 feet radius from each tree for each inch of Diameter at Breast Height (DBH). The fence shall be securely erected and installed prior to any movement through the project site by construction vehicles or equipment, and remain in place until construction and clean-up are completed. The critical root zone shall remain free of all construction activities including trenching, staging, stockpiling and storage of materials. Vehicles and equipment shall not drive or park within the critical root zone. Variation to the critical root zone size or configuration will only be permitted where it is absolutely necessary for construction of the project, and requires approval of the Contracting Officer. Short duration alterations of the critical root zone involving wood chips and limited equipment travel shall be submitted in writing for approval.

The Contractor shall not operate equipment in vegetated areas outside the work limits.

3.6.2.1 Restoration of Damaged Trees

Any existing tree designated to be protected that is damaged by the Contractor's operations shall be replaced. Trees will be considered damaged if the critical root zone in cohesive soils is compacted, if there are significant wounds that could contribute to rot, or if distress (evident by reduced growth or other observations of distress documented by a forester) is observed prior to closing the contract. Trees shall be replaced in kind on a caliper inch per caliper inch basis (DBH) (i.e. one 6-inch red oak shall be replaced with two 3-inch red oaks, three 2-inch red oaks, or six 1-inch red oaks). Replacement trees shall be planted in accordance with SECTION 02930: EXTERIOR PLANTING and guaranteed with the Contractor's standard warranty. Replacement tree size and location will be determined and staked by the Contracting Officer. Repair by pruning, aeration, soil conditioning, or other recommendation from a qualified forester will be considered as substitution for replacement by the Contracting Officer.

3.6.3 Pavement Removal and Replacement.

Where roads are cut, removed, or otherwise damaged in the prosecution of the work the Contractor shall replace all pavements or other surfacings so removed or damaged to their preconstruction condition, unless otherwise specified or indicated. After backfill is completed on paved streets, a temporary surface shall be laid down and the street opened to the traffic in order to provide access to abutting property. Restoration of the original street surface construction shall be completed no later than 60-calendar days after starting excavation. Should weather conditions preclude the restoration of the original surface material, temporary

resurfacing utilitizing a bituminous mixture shall be installed with the final surface constructed no later than June 1 of the following construction season.

3.6.4 Borrow and Disposal Areas

Each borrow area and disposal area is subject to the approval of the Contracting Officer. Proposed borrow areas which involve the excavation of wetlands or wooded areas will not be approved by the Contracting Officer. Disposal areas which involve the placement of materials in wetlands or floodplains areas will require a minimum of 30-calendar days for review for approval and disapproval.

3.6.5 Contaminated Materials

The Contractor shall comply with all applicable federal, state, and local requirements if contaminated soils, materials, and/or groundwater is/are encountered during construction activities within the contract project work limits. If contaminated materials/areas are encountered, the Contractor shall immediately notify in writing the following regarding such: the Contracting Officer, and each appropriate federal, state, and local agency. All work associated with implementation of a contingency plan and handling and/or disposal of contaminated soils, materials, and or groundwater shall be performed in accordance with CONTRACT CLAUSE: CHANGES.

3.6.6 Accident Prevention Plan

The contractor's accident prevention plan, as required in CONTRACT CLAUSES: ACCIDENT PREVENTION, shall specifically address site safety and monitoring with regards to possible encounters with contaminated soils, materials, and/or groundwater. The Contractor's accident prevention plan shall also include a contingency plan to be implemented immediately upon encountering contaminated soils, materials, and/or groundwater.

3.6.7 Work In Vicinity of River Banks

To the greatest extent possible, Contractor shall not stockpile material or use heavy equipment within 100 feet of the existing river banks.

3.6.8 Environmental Assessment of Contractor Deviations

Any deviations, requested by the Contractor, from the drawings and specifications, which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

3.6.9 Levee Removal

The work shall be sequenced so that the level of protection afforded by existing permanent levees (not including additional emergency raises completed in the Spring, 2001 flood fight) is maintained for areas within

the final constructed levee alignment. When existing levee integrity is removed, the Contractor shall be prepared to provide, if necessary, and shall provide when directed by the Contracting Officer, flood protection equal to the level of protection of the existing permanent levees prior to starting construction. The Contractor shall submit a sequencing plan which:

- a) Identifies areas where sequencing is necessary to maintain flood protection.
- b) Indicates how the work will be sequenced in the identified areas so that the potential exposure to flood threat is minimized and,
- c) Indicates how any reduction to levee protection, due to the Contractor's operations, will be restored when directed by the Contracting Officer.

3.7 OTHER CONTRACTS

The Contractor shall coordinate with other contractors in the performance of the work and schedule such work to provide for a minimum of delays and interferences. Coordination shall be through the Contracting Officer. Work listed below is currently required under separate contract or is scheduled to be awarded as a separate contract prior to completion of work under this contract. These contracts will be considered in the application of SECTION 00700: CONTRACT CLAUSE: OTHER CONTRACTS.

3.7.1 Other Contracts

Contracts for work within the project limits will be performed by others concurrent with this project. The City of East Grand Forks and utility companies will be working within the project limits to remove and relocate utilities in conflict with the project as described in PARAGRAPH: EXISTING UTILITIES. A list of projects that are known at this time to be performed in the City of East Grand Forks concurrent with the Phase 2 Levee contract are listed below with the estimated completion dates and Contractors performing the work, where known. The utility relocation projects are not listed.

		ESTIMATED
PROJECT	CONTRACTOR	COMPLETION DATE
Bygland Road/3rd Avenue SE Realignment		July 2002
(The Point Area)		

2001 City Project No. 3 - Paving July 2002

US TH 2 September 2002

Bygland Road/Mallory Road Modifications December 2003 (The Point Area)

In addition to the projects listed above, there are several flood control projects that will be performed in East Grand Forks, Minnesota and Grand Forks, North Dakota concurrent with this contract.

PROJECT CONTRACTOR COMPLETION DATE

English Coulee Diversion
Grand Forks, ND November 2003

Grand Forks, Phase 1 Levees May 2003

Grand Forks, Phase 2 Levees June 2004

East Grand Forks, Phase 1 Levees August 2004

Heartsville Coulee Diversion
East Grand Forks, The Point Area June 2004

3.8 GOVERNMENT-FURNISHED EQUIPMENT

3.8.1 General

The work of this contract includes installing equipment furnished by the Government. The Contractor shall be responsible for coordinating with each equipment supplier as necessary to fully understand the furnished equipment and documentation in order to correctly install Government furnished equipment in each pump station. The Government-furnished equipment is listed below. The Contractor shall be responsible for loading and unloading, transporting, installing, and testing the Government-furnished equipment. The Government-furnished equipment shall be transported to the project site from the storage location. The equipment will be available no later than the dates listed with each item below.

3.8.1.1 Storage Location and Contact

The Government furnished equipment will be stored at the water treatment facility at the address listed below. The storage area is in a locked facility. The Contractor shall coordinate with the Contracting Officer's Representative to arrange access to the Government furnished equipment.

503 South 4th Street Grand Forks, ND 58201

3.8.1.2 Government-Furnished Equipment List

Government furnished equipment is listed below:

Equipment
Furnished Item Quantity Availability Date
A. Stormwater Pumps and Accessories listed below will be supplied by, KSB
pumps provided by Quality Flow Systems Inc., 800 6th Street NW, New Prague,
MN 56701.

November 30, 2002

- 1. Stormwater Pumps, 3,000 GPM 2 Currently Available including discharge elbow and 50 feet of power and control cable 2. Sump Pumps, 500 GPM Currently Available including discharge elbow and 50 feet of power and control cable and access hatch 3. The pump guide system and 1 per pump Currently Available electronic interface module will be furnished for each pump 4. Pump Access Hatches 3 Currently Available (for all stormwater pumps, sump pumps and extra pump bays) 5. Documentation for stormwater pumps and Currently Available accessories, including copies of relevant shop submittals required by USACE supply contract, installation and erection instruction manuals, and operation and maintenance manuals. B. Generator Sets and Transfer Switches listed below will be supplied by Onan Corporation, 1400 73rd Avenue NE, Minneapolis, MN 55432. 6. Engine Generator Packages with 1 Currently Available Skid Mounted Fuel Storage Sub-bases 7. Transfer Switches 1 Currently Available 8. Documentation for generator sets and Currently Available
- C. Pump Controller Systems listed below will be supplied.

automatic transfer switches, including copies of relevant shop submittals required by USACE supply contract, installation and erection instruction manuals, and operation

and maintenance manuals.

- 8. Combination Motor Starters 2 November 30, 2002 (One/pump)
- 9. Controller Packages including SCADA 1 November 30, 2002
- 10. Level Sensor Packages 1 November 30, 2002
- 11. Documentation for pump controller sytems, including copies of relevant shop drawings submitted as required in USACE supply contract, assembly drawings, installation instruction manuals, and operation and maintenance manuals.

3.8.2 Delivery and On-Site Storage

Equipment shall be inspected for damage, loaded, transported, and unloaded with a minimum of handling. The Contractor shall notify the Contracting Officer of any damaged equipment prior to loading and transporting from the storage location. The equipment shall not be stored directly on the ground and shall be protected from any environment that would result in damage or deterioration to the equipment. The Contractor shall not remove any equipment from the Government storage facility unless installation in the pump stations is scheduled to occur within 15 calendar days of removing the Government furnished equipment from the storage facility. The Contractor shall complete installation of the Government furnished equipment within 15 calendar days of removal from the storage facility.

3.9 SHORING

3.9.1 General

At locations where shoring is not specifically required by the contract documents to safeguard adjacent structures, the Contractor may at its own option employ shoring for protecting work areas within excavations in lieu of performing excavation to safe and stable side slopes. The Contractor shall construct all shoring required in performing the excavations. Shoring shall be constructed in accordance with the safety requirements of EM 385-1-1.

3.9.2 Responsibility

The Contractor shall be responsible for design and maintenance of all shoring which the Contractor proposes to install. Shoring plan and design computations for all shoring used shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES at least 30 days prior to installation.

3.9.3 Removal

Unless otherwise authorized, all sheeting and bracing shall be removed when backfill is completed.

3.10 DEWATERING OPERATIONS

3.10.1 Scope

The Contractor shall design, furnish, install and operate dewatering systems in the execution of the contract work. The work involves the drawdown of water table and construction of temporary barriers (small cofferdams, earth dikes, sheeting, or other satisfactory types of barriers) to protect against the prevailing river stages and to permit, where specified or shown, placement of concrete, utilities, and fill in the dry.

3.10.2 Payment

No separate payment will be made for dewatering on this project and compensation for all dewatering operations will be included in the

respective contract items to which the work pertains.

3.10.3 Requirements

Control of groundwater shall be accomplished in a manner that will provide suitable working conditions for construction, preserve the strength of the foundation soils, will not cause instability of excavations, and will not result in damage to existing structures. Suitable working conditions for construction will provide a dry or moist subgrade free of standing, percolating, or running water during placement and curing of concrete, and placement and compaction of backfill. Where necessary to these purposes, the water level shall be lowered in advance of excavation utilizing wells, wellpoints, or similar methods. For structure foundations, the water level (as measured in piezometers) shall be maintained a minimum of 2 feet below the prevailing excavation level.

3.10.3.1 Design

If conditions warrant, and if not otherwise specified in the contract documents, dewatering may consist of collection in sumps or trenches, and open pumping. Sumps, trenches and running water shall not jeopardize erosion or ground loss near foundations, pipes, or other structures. Open pumping will not be permitted if it results in boils, seepage in concrete placement areas, loss of fines, softening of the ground, instability of slopes, or interference with orderly progress of the construction.

3.10.3.2 Regulations

Compliance with all regulations shall be incidental to the dewatering work. Disposal of water shall be in accordance with SECTION 01410: ENVIRONMENTAL PROTECTION and all applicable regulations. Dewatering water may be discharged through the City's storm water system. Well abandonment shall seal aquifers and confining layers in compliance with environmental regulations and permits.

3.10.3.3 Operation

Upon installation and commencement of dewatering operations, the system shall be operated continuously (24 hours/day, 7 days/week) until the structure and backfill are completed to the groundwater elevation. The Contractor shall be responsible for maintaining the system.

3.10.3.4 Removal

Upon completion of the work, well casing and screens shall be withdrawn, and all equipment shall be removed (including related temporary cofferdams, shoring, etc.)

3.10.4 Geologic and Hydrologic Information

Ground water elevations shown on the boring logs are those encountered at the time the borings were taken. Because groundwater elevations are dependent upon hydrologic conditions, variations in the water table should be expected. For work near the Red River of the North, refer to the

hydrographs included with the contract drawings. It shall be the Contractors responsibility to perform the necessary dewatering operations irrespective of the water elevations at the time of the work. However, nothing in this clause prohibits the Contractor from receiving a time extension under the Default clause, the Time Extensions for Unusually Severe Weather clause, or any other clause in this contract.

3.10.5 Specific Requirements for Wells

3.10.5.1 Screens

Wells and wellpoints shall be installed with suitable screens and filters so that continuous pumping of fines does not occur. Pumps shall discharge into a settling tank to check for movement of sand. Wells shall be sealed in accordance with State Health Department requirements.

3.10.5.2 Setback

The following criteria shall be followed to the maximum extent possible. Wellpoints shall be located a minimum horizontal distance away from structures (existing and proposed) equal to the depth of penetration below foundation elevation. Wells larger than 3 inches diameter shall be located a minimum horizontal distance away from structures equal to the depth of penetration below foundation elevation plus half the depth of penetration above foundation elevation.

3.10.5.3 Roads and Levees

Wells larger than 3-inches diameter shall not be jetted through roadway and levee embankments. Wells larger than 3-inches diameter located on the up-gradient side of levees, dikes, dams or floodwalls shall be screened without a gravel filter pack. These wells shall be abandoned by plugging the hole with a cement-bentonite grout. The screens shall include a loose end cap to allow removal of screen and casing without hole collapse.

3.10.6 Dewatering Plan

At least 30-calendar days prior to commencing work on the installation or construction of dewatering protection, the Contractor shall submit for review by the Contracting Officer prints showing plans and details of the type of construction, including shoring proposed for installation at each location. The design shall be in accordance with sound engineering practice as approved. This submittal data shall include computations covering the analysis and design layout, proposed methods of protection of construction work that would be subject to exposure to channel flows exceeding the dewatering protection capacity, type and spacing of dewatering devices, number and size of pumps and other equipment, together with a description of the installation and operating procedures, including relationship to the construction operations. The plan shall be reviewed and signed by a Registered Professional Engineer. The plan shall include the following items:

1. layout (including the relationship to site improvements and construction operations)

- 2. type, sizes, depth and spacing of dewatering devices
- 3. number and capacity of pumps
- 4. design assumptions, analysis methods, and calculations 4A. justification for pump capacity
 - 4B. justification for slot size on screens
 - 4C. justification for screen intake area
 - 4D. justification for filter pack gradation
- 5. description of installation equipment
- 6. description of operating procedures
- 7. description of discharge point (weirs, sedimentation basin, etc.)
- 8. type and location of monitoring equipment
- 9. removal and abandonment plans

3.10.7 Liability

Government review of the proposed dewatering system will not relieve the Contractor of full responsibility for the adequacy of the dewatering operations. The Contractor shall be responsible for dewatering effects on adjacent properties, including but not limited to blockage of easements, erosion or sedimentation of ditches, and encroachment onto private property by flooding from pump outlets and sedimentation basins.

3.10.8 Related Work

Shoring, trench support systems, cofferdams and diversion structures shall be coordinated with the dewatering effort to provide safe and reliable conditions.

3.10.9 Surface Water Management During Construction

The Red River of the North and Red Lake River are prone to experience extremely high flood stages of relatively long duration. The Contractor shall be responsible for monitoring local weather conditions and flow conditions in order to anticipate flooding conditions prior to their occurrence. The Contractor shall keep the Contracting Officer informed regarding all flooding conditions on the project.

The Contractor should satisfy itself before submitting its bid as to hazards that arise from weather conditions and flooding. Red River of the North rating curves and hydrographs are included in the contract drawings.

3.11 SURVEYS

3.11.1 Field Layout

The Contractor shall layout the work from the Government established bench marks in accordance with SECTION 00800: CONTRACT CLAUSE LAYOUT OF WORK. The construction of each feature of work shall follow the alignments as indicated on the drawings. The Contractor shall have in place, at least 7 calendar days prior to commencing construction operations, sufficient stakes and markings to enable the Contracting Officer to observe the field layout of the alignment and limits of each feature of work. For each feature of work, these stakes shall define areal limits such that the Contracting Officer can easily determine, without additional surveys, if alignment and/or limit adjustments need to be made. For embankments, levees, and similar work, these stakes shall define centerline, stationing, outermost fill/cut limits, and work limits. For structures and similar work, the corners shall be staked. General site work shall be staked to define staging areas, storage areas, and other area limits as directed. The Contracting Officer may waive these requirements for certain areas. The layout shall be sufficient for the Contracting Officer to mark trees, vegetation and other features to be left undisturbed. No work shall take place without approval of field layout by the Contracting Officer.

3.11.1.1 Alignment Changes

The Government reserves the right to make changes in the alignment of any feature of work as may be found necessary during the course of the contract. If it becomes necessary, through no fault of the Contractor, equitable adjustment for completed work will be made. No alignment changes or abandonment shall take place without prior written notice from the contracting Officer.

3.11.2 Utility As-builts

An as-built field survey of all utilities shall be conducted after installation to determine the final locations and elevations of all utility structures such as manholes, catch basins, hydrants, gate valves, cleanouts, service connections, and other special controls or structures. Final elevations shall be determined for all sewer inverts and castings. Locations shall be shown using the same convention as the original contract drawings(typically stationing and offset from known centerline). If no convention is used in the contract drawings, locations shall be tied to at least 2 permanent landmarks.

3.11.3 Quantity Surveys

The Contractor shall perform quantity and tolerance verification surveys for all features of work in accordance with SECTION 00800: SPECIAL CONTRACT REQUIREMENTS: QUANTITY SURVEYS--ALTERNATE I. Unless changed by the Contracting Officer, the Contractor shall provide cross sections at 100 foot intervals to verify the required section. Areas where payment for material is specified by volume shall be surveyed by the Contractor, prior to commencement of construction of each feature and upon completion of each feature, in enough detail to accurately determine quantities and verify the required section. The Contractor shall also provide a copy of the survey notes and cross sections to the Contracting Officer within 10 days after

completion of the survey.

3.12 PRECONSTRUCTION DAMAGE SURVEY

Prior to the start of contract construction operations in an area, the Contractor shall conduct preconstruction property damage surveys. These surveys shall be performed initially and repeated later as required.

3.12.1 Contacting

The Contractor shall have both letter and personal contact with residents, institutional operators, and/or business establishments that are within the project work limits and near enough for ground and noise vibrations to be considered objectionable. This contact shall be made prior to beginning potential vibration-producing activities. The Contractor shall submit a list of those individuals and companies contacted prior to vibration-producing activities.

3.12.2 Preconstruction Structure Surveys

Preconstruction surveys shall be performed by qualified specialists, as approved, and retained by the Contractor for observing the condition of existing structures in the vicinity of the work at required intervals. Each survey shall include all existing structures located entirely or partially within 100 feet of the proposed work limits. Each structure shall be completely surveyed even if only part of the structure is located within the survey limits. The preconstruction survey shall produce a report including diagrams as necessary of accessing all existing foundations, floors, walls, partitions, and roofs as determined by the Contracting Officer. The report shall show and describe existing interior and exterior cracks, including elevations and photographs and video tapes of cracks/damage, and such other data as applicable to locate and define the existing condition and the amount and extent of existing damage. All existing structure deficiencies, major or minor, shall be identified and recorded. Crack displacement monitoring gages shall be installed as appropriate in structures within a radius of 100 feet of the contract work in order to help verify distress if any should develop. Crack displacement monitoring gages shall be read by the Contractor on a weekly basis.

At a minimum the following structures shall be surveyed:

- 1) Water Treatment Plant, Reach 1, on 2nd Street NE near Station D170+00.
- 2) PortaMix office building and material silos, Reach 1, near Station D183+50.
- 3) All storage buildings from D210+00 to D237+00 between the project limits and the BNSF railroad tracks.

3.12.3 Underground Water Reservoir

Preconstruction and post-construction under water inspections of the interior of the one million gallon underground water reservoir in Reach 1, at approximately Station D164+00, shall be performed. The reservoir shall be inspected using disinfection procedures meeting AWWA C652-92. A report

including photographs and video tapes shall be provided as specified above. The Contractor shall provide all lights, tools, disinfection equipment, and other equipment necessary to perform the inspection. Removal of water from the reservoir for performance of the inspection will not be allowed.

3.12.4 Preconstruction Condition Surveys

The Contractor shall photograph and video tape facilities within the work limits, including, but not limited to, roads, borrow areas, side walks, trees, shrubs, and lawns prior to working in an area in order to document the preconstruction conditions. The Contractor shall also take photographs and video tape the conditions in the same areas upon completion of the project.

3.12.5 Preconstruction Survey Reports

The Contractor shall prepare and submit to the Contracting Officer, prior to the start of contract construction work/activities at each work site, two bound copies of each preconstruction damage report containing surveys, photographs, and video tapes, sketches and diagrams, field notes taken, descriptions and reports, all signed and witnessed by the persons involved in the survey. Thereafter, as contract work progresses, the Contractor shall resurvey as often as necessary, as required by the Contracting Officer, in order to verify the adequacy of the Contractor's construction methods for prevention of damage and to obtain sufficient evidence for use in defense against possible claims for damage from third parties. Data obtained by the Contractor from each resurvey shall be submitted to the Contracting Officer within 5 calendar days after the Contractor has obtained it.

3.12.6 Contractor Responsibility

Nothing contained herein shall relieve the Contractor of responsibility for claims arising from its construction operations. Failure to inspect any structure, whether or not required by the contract documents, or inadequacy of the inspections shall not relieve the Contractor of its responsibilities.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS

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- 1.2 ORDERING INFORMATION
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SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS 06/02

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the sponsoring organization, e.g. ASTM B 564 Nickel Alloy Forgings. However, when the sponsoring organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the organizations whose publications are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the sponsoring organization should be ordered from the source by title rather than by number.

ACI INTERNATIONAL (ACI)

P.O. Box 9094

Farmington Hills, MI 48333-9094

Ph: 248-848-3700 Fax: 248-848-3701

Internet: http://www.aci-int.org

AOK 6/00

AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

4301 North Fairfax Dr., Suite 425

ATTN: Pubs Dept.
Arlington, VA 22203
Ph: 703-524-8800
Fax: 703-528-3816
E-mail: ari@ari.org
Internet: www.ari.org

AOK 6/00

AIR CONDITIONING CONTRACTORS OF AMERICA (ACCA)

1712 New Hampshire Avenue, NW Washington, DC 20009

Ph: 202-483-9370 FAX: 202-588-1217

Intrnet: www.acca.org

AOK 6/00

AIR DIFFUSION COUNCIL (ADC)

104 So. Michigan Ave., No. 1500

Chicago, IL 60603 Ph: 312-201-0101 Fax: 312-201-0214

Internet: www.flexibleduct.org

AOK 6/00

AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

30 W. University Dr.

Arlington Heights, IL 60004-1893

Ph: 847-394-0150 Fax: 847-253-0088 Internet: www.amca.org

AOK 6/00

ALUMINUM ASSOCIATION (AA)

900 19th Street N.W. Washington, DC 20006 Ph: 202-862-5100 Fax: 202-862-5164

Internet: www.aluminum.org

AOK 6/00

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

1827 Walden Ofc. Sq.

Suite 104

Schaumburg, IL 60173-4268

Ph: 847-303-5664 Fax: 847-303-5774

Internet: www.aamanet.org

AOK 6/00

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

444 N. Capital St., NW, Suite 249

Washington, DC 20001

Ph: 800-231-3475 202-624-5800 Fax: 800-525-5562 202-624-5806

Internet: www.aashto.org

AOK 6/00

NOTE: AASHTO documents with numbers beginning with M or T are

available only in Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1998 @\$289.00\X

AMERICAN BEARING MANUFACTURERS ASSOCIATION (AFBMA)

1200 19th Street, NW, Suite 300 Washington, DC 20036-2422

Ph: 202-429-5155 Fax: 202-828-6042 Internet: abma-dc.org

AOK 6/00

AMERICAN BOILER MANUFACTURERS ASSOCIATION (ABMA)

950 North Glebe Road, Suite 160 Arlington, Virginia 22203-1824 Ph:703-522-7350

Fax: 703-522-2665 Internet: abma.com

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)

222 West Las Colinas Blvd., Suite 641

Irving, TX 75039-5423

Ph: 972-506-7216 Fax: 972-506-7682

Internet: http://www.concrete-pipe.org

e-mail: info@concrete-pipe.org

AOK 6/00

AMERICAN GAS ASSOCIATION (AGA)

400 N. Capitol St. N.W.Suite 450

Washington, D.C. 20001 Ph: 202-824-7000

Fax: 202-824-7115
Internet: www.aga.org

AOK 6/00

AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA)

1500 King St., Suite 201 Alexandria, VA 22314-2730

Ph: 703-684-0211 Fax: 703-684-0242 Internet: www.agma.org

AOK 6/00

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

One East Wacker Dr., Suite 3100 Chicago, IL 60601-2001

Ph: 312-670-2400

Publications: 800-644-2400

Fax: 312-670-5403
Internet: www.aisc.org

AOK 6/00

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

7012 So. Revere Parkway, Suite 140

Englewood, CO 80112 Ph: 303-792-9559 Fax: 303-792-0669

Internet: www.aitc-glulam.org

AOK 6/00

AMERICAN IRON AND STEEL INSTITUTE (AISI)

1101 17th St., NW Suite 1300

Washington, DC 20036 Ph: 202-452-7100

AOK 6/00

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

11 West 42nd St

New York, NY 10036 Ph: 212-642-4900 Fax: 212-398-0023

Internet: www.ansi.org/

Note: Documents beginning with the letter "S" can be ordered from:

Acoustical Society of America

P. O. Box 1020

Sweickley, PA 15143-9998

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NOTE: SSPC documents, except as noted otherwise, are available

only as a part of the 1995 Steel Structures Painting Manual, 7th Edition @ \$115.00.

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SECTION 01270

MEASUREMENT AND PAYMENT

06/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Quantity Surveys; FIO.

The Quantity Surveys are described in SECTION 01000: GENERAL: SURVEYS.

1.2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.2.1 Bonds

1.2.1.1 Payment

Payment will be made for costs associated with securing all bonds required of this contract.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.2.2 Preconstruction Damage Survey

1.2.2.1 Payment

Payment will be made for costs associated with operations necessary for conducting preconstruction damage surveys. Work shall include, but not be

limited to contacting property owners, photography, video photography, surveys, instrumentation, and preparation of reports.

1.2.2.2 Unit of Measure

Unit of measure: lump sum.

1.2.3 Miscellaneous Demolition

1.2.3.1 Payment

Payment will be made for costs associated with operations necessary for demolition and removal of existing structures and for removal and replacement of the water treatment plant reservoir overflow pipeline and appurtenant items. Items to be demolished includes, but is not limited to storm sewer structures and piping, bituminous pavement, concrete pavement, aggregate base, concrete curb and gutter, foundations and slabs from removed homes, utility services to removed homes, and watermain and sanitary sewer piping. Debris shall be taken off site for proper disposal. Payment for demolition of the existing water treatment plant, electrical substation, and overhead electrical transmission system will not be measured and paid for as part of this item and costs, therefore, should be included in the item to which the work pertains.

1.2.3.2 Unit of Measure

Unit of measure: lump sum.

1.2.4 Water Treatment Plant Demolition

1.2.4.1 Payment

Payment will be made for costs associated with operations necessary for demolition and removal of the existing water treatment plant and associated structures. Items to be demolished includes, but is not limited to the underground concrete clear water well, settling basins, pump house, treatment plant, chemical storage tanks. Demolition shall include the contents of the buildings and structures being removed. Debris shall be taken off site for proper disposal.

1.2.4.2 Unit of Measure

Unit of measure: lump sum.

1.2.5 Overhead Electrical Transmission System Removal

1.2.5.1 Payment

Payment will be made for costs associated with operations necessary for demolition and removal of the existing overhead electrical transmission system shown and associated structures. Items to be demolished includes, but is not limited to the electric transmission line and support poles and towers. Debris shall be taken off site for proper disposal.

1.2.5.2 Unit of Measure

Unit of measure: lump sum.

1.2.6 Electrical Substation Removal

1.2.6.1 Payment

Payment will be made for costs associated with operations necessary for demolition and removal of the existing electrical substation shown and associated structures. Items to be demolished includes, but is not limited to the electric transmission lines and support structures, storage and office buildings, fencing. Payment of this item shall include salvaging and reinstalling the fencing shown. Debris shall be taken off site for proper disposal.

1.2.6.2 Unit of Measure

Unit of measure: lump sum.

1.2.7 Clearing and Grubbing

1.2.7.1 Payment

Payment will be made for the costs associated with operations necessary to clear and grub within the work limits shown. Clearing and grubbing required for Reach 3 will not be measured for payment and costs, therefore shall be included in the item to which the work pertains for Reach 3 if necessary. Work shall include, but not be limited to, clearing, grubbing, filling of holes from clearing and grubbing operations, and disposing of clearing and grubbing debris. No allowances will be made for clearing and grubbing outside the limits of construction unless authorized.

1.2.7.2 Unit of Measurement

Unit of measure: lump sum.

1.2.8 Stripping

1.2.8.1 Payment

Payment will be made for the costs associated with operations necessary to perform stripping withing the work limits shown. Stripping will not be measured for payment. Work shall include, but not be limited to stripping vegetation, topsoil, and organic material within the limits shown, stockpiling, and disposing of excess stripped materials. No allowances will be made for stripping outside the limits of construction unless authorized.

1.2.8.2 Unit of Measurement

Unit of measurement: lump sum.

1.2.9 Geotechnical Monitoring System

1.2.9.1 Payment

Payment will be made for the costs associated with operations necessary for geotechnical monitoring systems. Work includes, but is not limited to, furnishing, installing, and surveying settlement plates, including piping, and coordinating with the Contracting Officer's Representative overseeing the installation of geotechnical monitoring systems as necessary.

1.2.9.2 Unit of Measure

Unit of Measure: lump sum.

1.2.10 Stoplog Closure Structures

1.2.10.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the stoplog closure structures. Stoplog closure structures include the BNSF/Hill Street, 2nd Avenue NE, and BNSF at Business Highway 2 structures in Reach 1, and the BNSF/Red River West structure in Grand Forks on Reach 3. Payment will be made separately for each stoplog control structure. Work shall include, but is not limited to excavation, concrete, reinforcement, formwork, backfill, miscellaneous metals, stoplogs, struts, bracing, metal sheet piling, stone veneer, simulated masonry, lighting fixtures, electrical conduit and receptacles, temporary shoring, dewatering, and traffic control, as needed. Payment for stoplog closure structures shall also include the costs of working on the BNSF Railroad Company right-of-way including, but not limited to coordination, flagging services, insurance, work performed by the BNSF Railroad Company and any other costs of complying with the railroad agreement. Payment for the BNSF at Business Hwy 2 Stoplog Closure shall also include the cost of the 24" RCP culvert and appurtenant items under the BNSF railroad near the closure.

1.2.10.2 Unit of Measurement

Unit of measure: lump sum.

1.2.11 Trenched Interior Drainage

1.2.11.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the interior drainage system except for the storm sewer pipes indicated to be installed by jacking techniques and the 24" RCP culvert under the BNSF railroad near the BNSF at Business Highway 2 Stoplog Closure. Work includes, but is not limited to providing culverts, manholes, catch basins, covers and frames, riprap, riprap bedding, geotextile filter, separation geotextile, storm sewer piping, excavation and backfill, sluice gate and frame, and shoring and dewatering as necessary. Restoration of items damaged during construction of trenched interior drainage facilities including, but not limited to turfed areas, roads, curb and gutter, and driveways not identified for payment elsewhere, is incidental to the price bid.

1.2.11.2 Unit of Measurement

Unit of measure: lump sum.

1.2.12 K14 Junction Manhole

1.2.12.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the junction manhole structure. Work shall include, but is not limited to excavation, concrete, reinforcement, formwork, backfill, grating and miscellaneous metals, stoplogs, and temporary shoring and dewatering as needed.

1.2.12.2 Unit of Measure

Unit of measure: lump sum.

1.2.13 K14 Impact Basin

1.2.13.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the impact basin structure. Work shall include, but is not limited to excavation, concrete, reinforcement, formwork, backfill, miscellaneous metals, metal sheet piling, and temporary shoring, dewatering, and traffic control as needed.

1.2.13.2 Unit of Measure

Unit of measure: lump sum.

1.2.14 Street Replacements

1.2.14.1 Payment

Payment will be made for the costs associated with operations necessary for replacing existing roads at 2nd Street NE in Reach 1 and James Avenue in Reach 2. Work includes, but is not limited to surveying, providing subgrade material, providing aggregate and concrete base, bituminous or concrete pavement, pavement markings, signage, and concrete curb and gutter. Restoration of driveways, driveway culverts, fences or other items damaged during construction that are not paid for elsewhere, are incidental to the price bid.

1.2.14.2 Unit of Measurement

Unit of measure: lump sum.

1.2.15 2nd Street NE Road Relocation

1.2.15.1 Payment

Payment will be made for the costs associated with operations necessary for constructing 2nd Street NE to grading grade to replace the existing 2nd Street NE in Reach 1. Work includes, but is not limited to, surveying, providing subgrade material, signage, and erosion protection. Restoration of driveways, culverts, fences or other items damaged during construction that are not paid for elsewhere, shall be incidental to the price bid.

1.2.15.2 Unit of Measurement

Unit of measure: lump sum.

1.2.16 Road Raises

1.2.16.1 Payment

Payment will be made for the costs associated with operations necessary for raising the profile of existing roads over new levees or structures. Roads to be raised include a bituminous road at Hill Street, bituminous road at Business Highway 2, concrete road at 2nd Avenue, and two gravel private roads in Reach 1. Work includes, but is not limited to construction of temporary road bypass or cross-overs, traffic control, road embankment, aggregate base and surfacing, bituminous and concrete pavement, signage, and replacement or installation of signage and pavement markings as needed. Restoration of driveway, driveway culverts, fences, and other items damaged that are not paid for elsewhere are incidental to the price bid.

1.2.16.2 Unit of Measurement

Unit of measure: lump sum.

1.2.17 Bituminous Trail

1.2.17.1 Payment

Payment will be made for the costs associated with the operations necessary to construct the bituminous trail including, but not limited to provision of bituminous, aggregate base and shoulders, permanent and removable bollards, trail signage, and trail payement markings.

1.2.17.2 Unit of Measure

Unit of Measure: lump sum.

1.2.18 Topsoil and Seeding, Class 1

1.2.18.1 Payment

The establishment of turf in areas shown to be seeded with Class 1 seed mixture. Work includes, but is not limited to provision of topsoil, seedbed preparation, providing seed, mulch, and maintenance of turf, including mowing and watering. Restoration of disturbed areas outside of work limits and haul roads is incidental to the price bid. No allowances will be made for seeding outside the limits of construction unless authorized.

1.2.18.2 Unit of Measurement

Unit of measure: lump sum.

1.2.19 Topsoil and Seeding, Class 2

1.2.19.1 Payment

The establishment of turf in areas shown to be seeded with Class 2 seed mixture. Work includes, but is not limited to provision of topsoil, seedbed preparation, providing seed, mulch, and maintenance of turf, including mowing and watering. Restoration of disturbed areas outside of work limits and haul roads is incidental to the price bid. No allowances will be made for seeding outside the limits of construction unless authorized.

1.2.19.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.20 Topsoil and Seeding, Class 3

1.2.20.1 Payment

The establishment of turf in areas shown to be seeded with Class 3 seed mixture. Work includes, but is not limited to provision of topsoil, seedbed preparation, providing seed, mulch, and maintenance of turf, including mowing and watering. Restoration of disturbed areas outside of work limits and haul roads is incidental to the price bid. No allowances will be made for seeding outside the limits of construction unless authorized.

1.2.20.2 Unit of Measure

Unit of measure: lump sum.

1.2.21 Topsoil and Seeding, Class 4

1.2.21.1 Payment

The establishment of turf in areas shown to be seeded with Class 4 seed mixture. Work includes, but is not limited to provision of topsoil, seedbed preparation, providing seed, mulch, and maintenance of turf, including mowing and watering. Restoration of disturbed areas outside of work limits and haul roads is incidental to the price bid. No allowances will be made for seeding outside the limits of construction unless authorized.

1.2.21.2 Unit of Measure

Unit of measure: lump sum.

1.2.22 Topsoil and Sod

1.2.22.1 Payment

Establishment of turf in areas shown or specified to be sodded. Payment

will include, but not be limited to costs for provision of topsoil, preparation, fertilizing, sodding, and maintenance including watering and mowing, and work incidental to the sodding. No additional payment will be made for sodding outside of the limits of work unless authorized by the Contracting Officer.

1.2.22.2 Unit of Measurement

Unit of measure: lump sum.

1.2.23 Trees and Shrubs

1.2.23.1 Payment

Payment for trees and will be made for costs associated with furnishing and installing, topsoil, mulch, trees, and shrubs and maintaining the trees and shrubs as shown and specified.

1.2.23.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.24 Griggs Park Recreational Area - Topsoil and Seeding

1.2.24.1 Payment

Establishment of turf in areas shown or indicated to be seeded in Griggs Park. Work includes, but is not limited to site grading, provision of topsoil, seedbed preparation, providing seed, mulch, and maintenance of turf, including mowing and watering within Griggs Park. The Griggs Park limits shall be considered to be the area bordered by Hill Street on the North, Central Avenue NE on the East, and the bitumious trail on the South and West. Restoration of disturbed areas outside of work limits and haul roads is incidental to the price bid. No allowances will be made for seeding outside the limits of construction unless authorized.

1.2.24.2 Unit of Measure

Unit of measure: lump sum.

1.2.25 Griggs Park Recreational Area - Topsoil and Sod

1.2.25.1 Payment

Establishment of turf in areas shown or specified to be sodded in Griggs Park. The Griggs Park limits shall be considered to be the area bordered by Hill Street on the North, Central Avenue NE on the East, and the bitumious trail on the South and West. Payment will include, but not be limited to costs for site grading, provision of topsoil, preparation, fertilizing, sodding, and maintenance including watering and mowing, and work incidental to the sodding. No additional payment will be made for sodding outside of the limits of work unless authorized by the Contracting Officer.

1.2.25.2 Unit of Measurement

Unit of measure: lump sum.

1.2.26 Griggs Park Recreational Area - Trees and Shrubs

1.2.26.1 Payment

Payment for trees and shrubs will be made for costs associated with furnishing and installing, topsoil, mulch, trees, and shrubs and maintaining the trees and shrubs as shown and specified within Griggs Park. The Griggs Park limits shall be considered to be the area bordered by Hill Street on the North, Central Avenue NE on the East, and the bitumious trail on the South and West.

1.2.26.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.27 K14 Pump Station - Pump Station Structure

1.2.27.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the pump station. Work shall include, but is not limited to excavation, concrete, concrete block, reinforcement, formwork, backfill, grating, ladders, trash racks, miscellaneous metals, siding, roofing, and temporary shoring, concrete driveways, dewatering, and traffic control as needed.

1.2.27.2 Unit of Measure

Unit of measure: lump sum.

1.2.28 K14 Pump Station - Electrical

1.2.28.1 Payment

Payment will be made for the costs associated with providing electrical facilities for the pump station as shown and specified. The cost of providing electrical service will be paid for separately and the costs, therefore should be included in the item K14 Electrical Service.

1.2.28.2 Unit of Measurement

Unit of measure: lump sum.

1.2.29 K14 Pump Station - Install Engine Generator Set

1.2.29.1 Payment

Payment will be made for the costs associated with providing mechanical and electrical facilities for the pump station as shown and specified including, but not limited to loading, transporting, delivering,

installing, and testing Government supplied engine generator sets, exclusive of generator manufacturer's representative services which will be supplied under a separate contract by the Government. Work associated with the electrical load bank shall not be included in the payment for this item and shall be paid for as part of the Furnish and Install Load Bank item.

1.2.29.2 Unit of Measurement

Unit of measure: lump sum.

1.2.30 K14 Pump Station - Mechanical

1.2.30.1 Payment

Payment will be made for the costs associated with providing mechanical facilities for the pump station as shown and specified including but not limited to loading, transporting, delivering, installing and testing government supplied pumps, providing monorails and hoists, discharge piping, flap valves, and heating and ventilation system.

1.2.30.2 Unit of Measurement

Unit of measure: lump sum.

1.2.31 K14 Pump Station - Electrical Service

1.2.31.1 Payment

Payment will be made for the costs associated with providing electrical service to the pump station location as specified. The Contractor shall reimburse the City of East Grand Forks for the costs associated with providing the electrical service at the pump station location.

1.2.31.2 Unit of Measure

Unit of measure: lump sum.

1.2.32 K14 Pump Station - Pump Station Sluice Gates

1.2.32.1 Payment

Payment will be made for the costs associated with operations necessary to provide the sluice gates for the pump station as shown and specified, including but not limited to, sluice gates, thimbles, manual operators, and hydraulic portable operators.

1.2.32.2 Unit of Measurement

Unit of measure: lump sum.

1.2.33 K14 Gatewell - Gatewell Structure

1.2.33.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the gatewell structure. Work shall include, but is not limited to excavation, concrete, reinforcement, formwork, backfill, grating, ladders, trash racks, stoplogs, miscellaneous metals, metal sheet piling, and temporary shoring, dewatering, and traffic control as needed.

1.2.33.2 Unit of Measurement

Unit of measure: lump sum.

1.2.34 K14 Gatewell - Gatewell Sluice Gates

1.2.34.1 Payment

Payment will be made for the costs associated with operations necessary to provide the sluice gates for the gatewell as shown and specified, including but not limited to, sluice gates, thimbles, manual operators, and hydraulic portable operators.

1.2.34.2 Unit of Measurement

Unit of measure: lump sum.

1.2.35 Griggs Park Recreational Area - Site Lighting

1.2.35.1 Payment

Payment will be made for costs associated with performing all operations necessary for construction of exterior lighting systems. Work includes, but is not limited to excavation, trenching, backfilling, conductors, enclosures, concrete foundations for lighting, power distribution, light poles, fixtures, floodlights, control centers and incidental items. Payment shall also include the costs associated with providing electrical service to the Griggs Park location as specified. The Contractor shall reimburse the City of East Grand Forks for any costs associated with providing the electrical service for lighting at the Griggs Park location.

1.2.35.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.36 Griggs Park Recreational Area - Recreational Facility

1.2.36.1 Payment

Payment will be made for costs associated with operations necessary for the construction of the restroom structure. Work includes, but is not limited to structural excavation and backfill, granular fill, site grading, reinforced concrete foundations and slabs, masonry block walls, structural steel, roof systems, doors, windows, skylights, architectural interior and exterior treatments, piping, plumbing fixtures, water meter, attached drinking fountains, exhaust fans, exhaust grill, heaters, thermostats, water heaters, water storage tank, toilet room accessories, electrical raceways, conductors, enclosures, grounding, lighting,

receptacles,occupancy sensor, hand dryers, and switches, and incidental items. Payment for this item shall also include the costs associated with providing water and sewer service to the restroom as shown and specified. The Contractor shall compensate the City of East Grand Forks for the costs of providing electrical service at each restroom structure.

1.2.36.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.37 Griggs Park Recreational Area - Site Furnishings

1.2.37.1 Payment

Payment will be made for costs associated with provision of site furnishings shown and specified at the Griggs Park recreational facility that are not paid for separately elsewhere including, but not limited to barbeque grills, park benches, picnic tables, kiosk, telephone enclosure, and park shelter. The work of this item includes, but is not limited to earthwork, provision of site furnishing, provision of electrical facilities and services, and provision of concrete pads.

1.2.37.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.38 Griggs Park Recreational Area - Parking Lot

1.2.38.1 Payment

Payment will be made for costs associated with operations necessary to construct the bituminous parking lot at Griggs Park. Work includes, but is not limited to site grading, compaction of subgrade, providing aggregate base, bituminous pavement, pavement markings, signage, curbs and gutters, and incidental items.

1.2.38.2 Unit of Measurement

Unit of Measure: lump sum.

1.2.39 Griggs Park Recreational Area - Concrete Walks/Paving

1.2.39.1 Payment

Payment will be made for the costs associated with the operations necessary to construct the concrete paving of sidewalks and walkways in Griggs Park including, but not limited to excavation, preparation of subgrade, provision of aggregate base, site grading, and provision of concrete, reinforcement, and concrete formwork. Concrete pads for site furnishings will not be paid for as part of this item and will be paid for as part of the item Griggs Park Recreational Area - Site Furnishings.

1.2.39.2 Unit of Measure

Unit of measure: lump sum.

1.2.40 K14 Pump Station - Furnish and Install Load Bank

1.2.40.1 Payment

Payment will be made for the costs associated with providing mechanical and electrical facilities for each pump station as shown and specified including, but not limited to furnishing a load bank as specified and installing the load bank in the exhaust ductwork downstream of the engine generator set. All power and control wiring to connect the load bank into the station electrical and generator control panels shall be included as part of this work.

1.2.40.2 Unit of Measurement

Unit of measure: lump sum.

1.3 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.3.1 Excavation

1.3.1.1 Payment

Payment will be made for costs associated with excavation for the drainage ditches shown. Disposition of excess excavated material and unsuitable and frozen materials will be incidental to the price bid for excavation. Excavation does not include excavation for jacked or trenched interior drainage, excavation for structures, excavation for utilities, off-site borrow excavation and any other excavation where measurement and payment is specified elsewhere.

1.3.1.2 Measurement

Excavation shall be measured for payment by the cubic yard, in there original position, using the average-end-area method based on the original ground lines as determined by the required survey and the lines and grades shown. Final surveys shall be used for any authorized over-depth excavation. The Contractor shall be responsible to perform the necessary quantity surveys. Except for authorized over-depth excavation materials removed outside the lines and grades shown will not be measured for payment. Material removed outside the lines and grades shown, but within the specified tolerance will not be measured for payment. All costs therefore, shall be included in the bid item to which the work pertains.

1.3.1.3 Unit of Measure

Unit of Measure: Cubic yard.

1.3.2 Levee Removal

1.3.2.1 Payment

Payment will be made for costs associated with excavation of existing levees, which includes performing required excavation, stockpiling of acceptable materials for levee construction, disposition of unacceptable materials, and grading and restoration following completion of levee removal.

1.3.2.2 Measurement

Levee removal shall be measured for payment by the cubic yard, in the original position, using the average-end-area method based on original and final ground lines as determined by the required surveys. The Contractor shall be responsible to perform the necessary quantity surveys. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations.

1.3.2.3 Unit of Measure

Unit of measure: cubic yard.

1.3.3 Inspection Trench

1.3.3.1 Payment

Payment will be made for costs associated with excavation, dewatering and backfilling inspection trenches with acceptable, compacted impervious material as specified and as shown. Stockpiling of acceptable material for later use and disposition of unacceptable materials will be incidental to the price bid for inspection trenches. Removal of utility services and debris during inspection trench operations shall be considered incidental.

1.3.3.2 Measurement

Inspection trenches will be measured for payment by the linear foot. Inspection trenches excavated beyond the limits shown on the drawings and not authorized by the Contracting Officer will not be measured for payment.

1.3.3.3 Unit of Measure

Unit of measure: linear foot.

1.3.4 Inspection Trench at Removed Building Site

1.3.4.1 Payment

Payment will be made for costs associated with excavation, dewatering and backfilling inspection trenches with acceptable, compacted impervious

material as specified and as shown. Stockpiling of acceptable material for later use and disposition of unacceptable materials will be incidental to the price bid for inspection trenches. Removal of utility services and debris encountered during inspection trench operations shall be considered incidental.

1.3.4.2 Measurement

Inspection trenches will be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas excavated after clearing, grubbing, and stripping operations have been completed. The Contractor shall be responsible to perform necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of inspection trench at removed building site for payment. Inspection trenches excavated beyond the limits shown on the drawings and not authorized by the Contracting Officer will not be measured for payment.

1.3.4.3 Unit of Measure

Unit of measure: cubic yard.

1.3.5 Random Fill

1.3.5.1 Payment

Payment will be made for the costs associated with the furnishing, final placement and compaction of random fill for the construction of the bituminous trail and for the random fill adjacent to levees and trails to facilitate drainage from levees and bituminous trail as shown.

1.3.5.2 Measurement

Random fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of random fill for payment.

1.3.5.3 Unit of Measure

Unit of measure: cubic yard.

1.3.6 Impervious Fill

1.3.6.1 Payment

Payment will be made for the costs associated with the furnishing, final placement and compaction of impervious fill for the construction of the levees and bituminous trail.

1.3.6.2 Measurement

Impervious fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of impervious fill for payment. The water reservoir reinforcing wall in Reach 1 shall be considered incidental to Impervious Fill.

1.3.6.3 Unit of Measure

Unit of measure: cubic yard.

1.3.7 Select Impervious Fill

1.3.7.1 Payment

Payment will be made for the costs associated with the final placement and compaction of select impervious fill for the construction of the levees and bituminous trail.

1.3.7.2 Measurement

Select impervious fill shall be measured for payment by the cubic yard and quantities will be determined by the average-end-area method. The basis for payment will be cross sections of areas to be filled taken after clearing, grubbing, and stripping operations or the placement of underlying impervious fill material, where applicable, and the theoretical cross sections of the embankments constructed within the specified tolerance. The Contractor shall be responsible to perform the necessary quantity surveys. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed 50 feet. Volumes occupied by structures and piping will not be included in the measurement of select impervious fill for payment.

1.3.7.3 Unit of Measure

Unit of measure: cubic yard.

1.3.8 Floodwalls

1.3.8.1 Payment

Payment for Water Treatment Plant Floodwall and James Avenue Floodwall will

be made for costs associated with construction of the floodwalls as shown and specified. Payment for floodwall shall include, but not be limited to, structural excavation, backfill to existing grade, concrete, formwork, reinforcement, simulated stone masonry, sheetpile and items incidental to the floodwall construction.

1.3.8.2 Measurement

Floodwall will be measured on a linear foot basis from each end of the concrete wall, excluding the tie-back and sheetpile walls.

1.3.8.3 Unit of Measure

Unit of measure: linear foot.

1.3.9 Jacked Interior Drainage

1.3.9.1 Payment

Payment will be made for the costs associated with operations necessary for construction of the interior drainage system indicated to be installed by jacking techniques. Payment will be made separately for the 36" RCP and 54" RCP. Work includes, but is not limited to providing manholes, catch basins, covers and frames, riprap, riprap bedding, geotextile filter, separation geotextile, storm sewer piping, casing pipe, sand and grout to fill the casing pipe, excavation and backfill, and shoring and dewatering as necessary. Restoration of items damaged during construction of jacked interior drainage facilities including, but not limited to roads and structures, is incidental to the price bid.

1.3.9.2 Measurement

Jacked Interior Drainage will be measured on a linear foot basis, for each pipe size, along the centerline of the pipeline from each end of the segment of jacked pipe.

1.3.9.3 Unit of Measurement

Unit of measure: Linear Foot

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01312

QUALITY CONTROL SYSTEM (QCS) 08/01

PART 1 GENERAL

1.1 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

Administration Finances Quality Control Submittal Monitoring Scheduling Import/Export of Data

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format.

Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

Particular attention is directed to other clauses which have a direct relationship to the reporting to be accomplished through QCS:

52.236-15 Schedules for Construction Contracts, 52.232-5 Payments Under Firm Fixed Price Construction Contracts, Section 01330, SUBMITTAL PROCEDURES, [Section 01320, PROJECT SCHEDULE, Section 01451, CONTRACTOR QUALITY CONTROL]

There is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal

computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on 3-1/2 inch high-density diskettes or CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

Hardware

IBM-compatible PC with 200 MHz Pentium or higher processor

32+ MB RAM

4 GB hard drive disk space for sole use by the QCS system

3 1/2 inch high-density floppy drive

Compact disk (CD) Reader

Color monitor

Laser printer compatible with HP LaserJet III or better, with minimum 4 MB installed memory.

Connection to the Internet, minimum 28 BPS

Software

MS Windows 95 or newer version operating system (MS Windows NT 4.0 or newer is recommended)

Word Processing software compatible with MS Word 97 or newer

Internet browser

The Contractor's computer system shall be protected by virus protection software that is regularly upgraded with all issued manufacturer's updates throughout the life of the contract.

Electronic mail (E-mail) compatible with MS Outlook

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website; the Contractor can obtain the current address from the Government. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control(CQC) Training

The use of QCS will be discussed at the Contractor's QC System Manager Training classes.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government shall provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government shall be submitted with file attachments, e.g., daily reports, schedule updates, payment requests. The QCS database typically shall include current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, and management staff. The Contractor shall deliver Contractor administrative data in electronic format prior to the preconstruction conference.

1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. The Contractor shall deliver subcontractor administrative data in electronic format prior to the preconstruction conference.

1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to

the Contractor will be prefixed with "C".

1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.2 Finances

1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data with file attachment(s). A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports.

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking.

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.6.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.4 Accident/Safety Tracking.

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 200.

1.6.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government

via QCS.

1.6.4 Submittal Management

The Government will provide the initial submittal register, ENG Form 4288, SUBMITTAL REGISTER, in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Contract Clause "Schedules for Construction Contracts", and Section 01320, PROJECT SCHEDULE. This schedule shall be input and maintained in the RMS-QC database. The updated schedule data shall be included with each pay request submitted by the Contractor.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION

The Contractor shall submit updates, payment requests, correspondence and other data in the format directed by the Contracting Officer. Submission formats available include diskettes, CD-ROM, or E-mail. Generally, E-mail is preferred for submissions from the Contractor's home office, and diskette or CD-ROM is preferred for submissions from the contractor's field office.

Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of

running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The Government will provide the file names to be used by the Contractor with the QCS software.

1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

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SECTION 01320

PROJECT SCHEDULE 06/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Schedules

Initial Project Schedule; GA. Periodic Updates; GA.

Five copies of the initial project schedule shall be submitted. Two copies of periodic project schedule updates shall be submitted.

SD-14 Samples

Software; FIO.

The Contractor shall furnish the Government copies of the scheduling software if required under paragraph COMPUTER SOFTWARE REQUIREMENTS.

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

PART 2 PRODUCTS

2.1 COMPUTER SOFTWARE REQUIREMENTS

The Contractor shall furnish the Government with the software to be used, unless waived by the Contracting Officer. The Contactor shall assist in installing the software in the Government resident office. The Contractor shall provide the software complete, including documentation and updates used in the Contractor's system. The software shall remain the property of the Contractor, but shall be in the possession of and for the exclusive use by the Government during the contract period. The Government shall have rights to install the software on 3 computers (resident office, area office, and district office).

PART 3 EXECUTION

3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a project schedule as described below shall be prepared. The scheduling of work shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall contribute in developing and maintaining an accurate project schedule. The approved project schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of progress payments.

3.2 BASIS FOR PAYMENT

The project schedule shall be the basis for measuring Contractor progress. The Contracting Officer will use an approved project schedule to evaluate Contractor progress for payment purposes. In the case where project schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the project schedule, then the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until the project schedule updates have been accepted.

3.3 SOFTWARE

Computer software systems utilized by the Contractor to produce the project schedule shall be capable of providing all requirements of this specification.

3.3.1 Use of the Critical Path Method

The project schedule shall clearly show the critical path. If a network analysis system is used, the Critical Path Method (CPM) of network calculation shall be used to generate the project schedule, provided in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

3.3.2 Level of Detail Required

The project schedule shall include an appropriate level of detail. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the project schedule.

3.3.2.1 Activity Durations

The Contractor shall breakout lump-sum or sum-job contract line items into subcategories, or activities. The number of activities shall be sufficient to allow the progress to be accurately determined between payment periods.

3.3.2.2 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over calender 90 days. Examples of procurement process activities

include, but are not limited to: submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing.

3.3.2.3 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government furnished property, and notice to proceed for phasing requirements.

3.3.2.4 Responsibility

All activities shall be identified in the project schedule by the party (Prime Contractor, subcontractor, Government agency, etc.) responsible to perform the work. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.5 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project schedule. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from notice to proceed to the contract completion date. The notice to proceed date shall be taken as the date that notice to proceed was acknowledged.

3.3.3.1 Constraint of Last Activity

Completion of the last activity in the project schedule shall be constrained by the contract completion date. If the early finish of the last activity falls after the contract completion date, then the critical path shall show a negative float.

3.3.3.2 Early Project Completion

If the project schedule shows project completion prior to the contract completion date, the Contractor shall identify activities that have been accelerated and activities that are scheduled in parallel to support the "early" completion. The Contractor shall assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.3.5 Default Progress Data Disallowed

The Contractor shall document the actual start and actual finish dates on the daily quality control report for every in-progress or completed activity and ensure that the data contained on the daily quality control reports is the sole basis for project schedule updating. Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual start and finish dates on the CPM schedule shall match those dates provided from Contractor quality control reports.

3.3.6 Out-of-Sequence Progress

The Contracting Officer shall be notified prior to work on any activities that are out-of-sequence with the project schedule. The Contractor shall update the project schedule to correct any out-of-sequence work.

3.3.7 Extended Non-Work Periods

Non-work periods of over 5 working days shall be identified by addition of activities that represent the delays.

3.3.8 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below.

3.4.1 Initial Project Schedule Submission

The project schedule shall provide a reasonable sequence of activities which represent work through the entire contract period and shall be at a reasonable level of detail.

3.4.2 Periodic Updates

Based on the result of progress meetings, the Contractor shall submit periodic project schedule updates. The Contractor shall furnish information and project schedule data, which in the judgement of the Contracting Officer, is necessary for verifying the Contractor's progress.

3.4.3 Standard Activity Coding Dictionary

The Contractor shall submit, with the initial project schedule, a coding scheme that shall be used throughout the project schedule for all activity codes contained in the project schedule. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. For example, a responsibility code value, "ELE", may be identified as "Electrical Subcontractor". Activity code values shall represent the same information throughout the duration of the contract.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted for each project schedule submission:

3.5.1 Earnings Report

The Contractor shall submit a compilation of the Contractor's Total Earnings on the project through the most recent Monthly Progress Meeting. Activities shall be grouped by contract line item. The printed report shall contain, for each contract line item: activity number, activity description, original budgeted amount, total quantity, quantity to date, percent complete (based on cost), and earnings to date. A total project percent complete shall also be provided. If necessary to substantiate partial payment and requested by the Contracting Officer, the earnings report shall detail activities within a contract line item.

3.5.2 Network Diagram

A network diagram shall be required on the initial project schedule submission and on periodic submissions when requested by the Contracting Officer (not less than quarterly). The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The network diagram shall be constructed to meet the following conditions:

- a. Continuous Flow. Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram.
- b. Project Milestone Dates. Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.
- c. Critical Path. The critical path shall be clearly shown.
- d. Banding. Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.
- e. S-Curves. Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project.

3.6.1 Meeting Attendance

The Contractor's project manager and the Contractor's authorized representative responsible for preparation of the project schedule shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after every third monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including actual start dates, actual finish dates, remaining durations, and cost-to-date shall be subject to the approval of the Contracting Officer. The Contractor shall address the following minimum set of items, on an activity by activity basis, during each progress meeting.

- a. Start and Finish Dates. The actual start and actual finish dates for each completed activity. The actual start and projected finish dates for each activity in-progress.
- b. Cost Completion. The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains defects.
- c. Project Schedule Changes. All changes pertaining to notice to proceed on change orders, change orders to be incorporated into the project schedule, Contractor proposed changes in work sequence, corrections to project schedule for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.
- d. Other Changes. Other changes required due to delays in completion of any activity or group of activities include unusually severe weather, product procurement, or other delays or work stoppages which make re-planning the work necessary.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, the Contractor shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract.

3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon an approved project schedule and

other factual information. Delays that are caused by the Contractor's own actions will not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification in accordance with the requirements of other appropriate contract clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the cause(s) of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. If requested by the Contracting Officer, the Contractor shall provide an interim project schedule update with revised activities.

3.8 DIRECTED CHANGES

If notice to proceed is issued for undefinitized work, the Contractor shall submit proposed project schedule revisions to the Contracting Officer within 14 calender days of the notice to proceed being issued. The proposed revisions to the project schedule must be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor suggested revisions to the project schedule; and the Contractor shall update the project schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached.

3.9 OWNERSHIP OF FLOAT

Float available in the project schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

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SECTION 01330

SUBMITTAL PROCEDURES 06/02

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers as follows:

- SD-01 Data
- SD-04 Drawings
- SD-06 Instructions
- SD-07 Schedules
- SD-08 Statements
- SD-09 Reports
- SD-13 Certificates
- SD-14 Samples
- SD-18 Records
- SD-19 Operation and Maintenance Manuals

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of SECTION 00700: CONTRACT CLAUSE entitled "SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION," they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with SECTION 00700: CONTRACT CLAUSE "CHANGES" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.6 MEASUREMENT AND PAYMENT

The work of this section will not be measured for payment. The Contractor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the

acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register as a diskette containing the computerized ENG Form 4288 and instructions on the use of the diskette. Columns "d" through "r" have been completed by the Government; the Contractor shall complete columns "a", "b", "c" and "s" through "u" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 7 calendar days after Notice to Proceed. The Contractor shall keep the submittal register up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. The submittal register shall provide for a reasonable timely distribution of shop drawings as they are prepared (particularly within a specific discipline, i.e.: structural, mechanical).

3.4 TRANSMITTAL FORM (ENG FORM 4025-R)

The sample transmittal form (ENG Form 4025-R) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

3.5.1 Submittal Copies

The Contractor shall submit 6 copies of each submittal (both government approved and for information only) unless otherwise indicated. Each transmittal shall address only one submittal item. Transmittals returned for resubmission shall be resubmitted in their entirety. When approved by

the Contracting Officer, routine test reports and delivery tickets may be submitted with daily quality control reports in place of following submittal procedures under this section.

3.5.2 Schedule

Shop drawings shall be submitted with ample time to secure Government approval prior to the time the items covered thereby are to be delivered to the site. Additional time should be allowed for possible resubmittal. Materials fabricated or delivered without Government approval of the shop drawing will be subject to rejection. All submittals shall be made prior to commencement of applicable work, and allow adequate time for government review acceptable to the Contracting Officer.

3.5.3 Shop Drawings

Shop drawings shall be reproductions on high quality paper with clear legible print. Drawings shall generally be bordered a minimum of one inch and trimmed to neat lines. Shop drawing quality will be subject to approval. Each shop drawing, including catalog data, shall be identified with a title block including the name of the Contractor, contract number, name and location of project, and name of the item of work or structure to which the shop drawing applies. Catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. Catalog data must be supplemented as necessary to include all pertinent data to verify conformance to the contract documents. When catalog data includes non applicable data, the applicable data shall be clearly indicated.

3.5.4 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025-R shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Five copies of the submittal will be retained by the Contracting Officer and 1 copy of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of

the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR
(Firm Name)
(= ====)
Approved
Approved with corrections as noted on submittal data and/or
attached sheets(s).
SIGNATURE:
TITLE:
DATE:

3.10 CONTRACTOR RECORD DRAWINGS

The Contractor shall maintain a separate set of marked-up full-scale contract drawings indicating as-built conditions. These drawings shall be maintained in a current condition at all times until completion of the work and shall be available for review by Government personnel at all times. All variations from the contract drawings, for whatever reason, including those occasioned by modifications, optional materials, and the required coordination between trades, shall be indicated. These variations shall be

shown in the same general detail utilized in the contract drawings. Revisions shall be shown on all drawings and details related to the changed feature. These drawings shall be neatly prepared with clear legible print. Deleted items shall be indicated in red and added items or changed locations shall be shown in green. These drawings shall be furnished to the Contracting Officer within 30 days after the required contract completion date.

3.10.1 As-Built Shop Drawings

The Contractor shall record changes to shop drawings to indicate as-built conditions. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted.

-- End of Section --

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INSTRUCTIONS

- 1. Section I will be initiated by the Contractor in the required number of copies.
- 2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriatebox; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
- 3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.
- 4. Submittals requiring expeditious handling will be submitted on a separate form.
- 5. Separate transmittal form will be used for submittals under separate sections of the specifications.
- 6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
- 7. Form is self-transmittal, letter of transmittal is not required.
- 8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
- 9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A -- Approved as submitted. E -- Disapproved (See attached).

B -- Approved, except as noted on drawings. F -- Receipt acknowledged.

C -- Approved, except as noted on drawings. FX -- Receipt acknowledged, does not comply Refer to attached sheet resubmission required. as noted with contract requirements.

D -- Will be returned by separate correspondence. G -- Other (Specify)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

CONTRACTOR

SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 01000 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL FICATION ACTION ACTION SCHEDULE DATES O I & N M F A C G O V A E P R E SUBMIT ٧ TRANS-SPECIFICATION APPROVAL MATERIAL TO E M PARAGRAPH NEEDED GOVERN-NEEDED MITTAL DESCRIPTION OF Ė W C 0 С О NUMBER ITEM SUBMITTED MENT NO. **SUBMIT** BY BY DATE DATE REMARKS E V N E T D N O Ν E R D E D E ö aa. Utility As-Builts 1.4 1.4 Dewatering Plan Shoring plan 1.4 Haul Route Permits 1.4 **Utility Service Interruption Request** Χ Χ 3.1.3.1 Traffic Control Plan Χ 1.4 Levee Removal/Flood Protection Plan Х 1.4 Railroad Stoplog Closure Work Plan 1.4 **MNDOT Permits** 1.4 Preconstruction Damage Report

TITLE AND LOCATION

CONTRACT NO.

TITLE AND LOCATION CONTRACTOR SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 01270

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CONTRACT NO.

TITLE AND LOCATION CONTRACTOR SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 01320

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TITLE AND LOCATION

CONTRACTOR

SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 01451 GOVERNMENT ACTION CLASSI-CONTRACTOR CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES ACTION O I & N M F A C G O V A E P T S T T T M F O N R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY DATE MENT CODE NO. SUBMIT BY DATE REMARKS E V N E T D N O Ν ö aa. 1.2 Contractor Quality Control (CQC) Plan 1.2 Laboratory Quality Management Manual 1.2 Documentation of work

TITLE AND LOCATION

CONTRACT NO.

TITLE AND LOCATION CONTRACTOR SPECIFICATION SECTION

East Grand Forks, Phase 2 Levees 01500

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CONTRACT NO.

East Grand Forks, Phase 2 Levees 01567 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P T S T T M F O R M R A C E E E E I A E A M W T D M P C M C N A O D I I U E O A N O L N R T L R A I N T G N E T T E E D L O L A S S S S S S S S S N Y R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY DATE MENT CODE NO. SUBMIT BY DATE REMARKS E V N E T D N O Ν ö aa. 1.3 Temporary Erosion And Sediment Control Plan Application Χ 1.3 1.3 Notice of Termination

TITLE AND LOCATION

CONTRACTOR

SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 01568 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P T S T T M F O R M R A C E E E E I A E A M W T D M P C M C N A O D I I U E O A N O L N R T L R A I N T G N E T T E E D L O L A S S S S S S S S S N Y R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY DATE MENT CODE NO. SUBMIT BY DATE REMARKS E V N E T D N O Ν ö aa. 1.3 Temporary Erosion And Sediment Control Plan Notice of Intent (NOI) Χ 1.3 Notice of Termination 1.3

TITLE AND LOCATION

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CONTRACT NO.

TITLE AND LOCATION SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 02220

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TITLE AND LOCATION SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 02300 CLASSI-FICATION CONTRACTOR ACTION GOVERNMENT ACTION CONTRACTOR TYPE OF SUBMITTAL SCHEDULE DATES O I & N M F A C G O V A E P R E V SUBMIT Τ APPROVAL NEEDED TO GOVERN-TRANS-SPECIFICATION PARAGRAPH MATERIAL NEEDED E M MITTAL DESCRIPTION OF E W E R C 0 С О NUMBER ITEM SUBMITTED BY MENT NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O Ν D E D E ö aa. Testing 1.2 Daily Report Forms;

ENG FORM 4288, Jul 96 **SPECSINTACT** PAGE 1 OF 1 PAGES

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TITLE AND LOCATION SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 02315

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East Grand Forks, Phase 2 Levees 02464 GOVERNMENT ACTION CLASSI-CONTRACTOR CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES ACTION O I & N M F A C G O V A E P T S T T T M F O N R E V SUBMIT TO GOVERN-TRANS-SPECIFICATION APPROVAL MATERIAL E M PARAGRAPH NEEDED NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED MENT CODE NO. SUBMIT BY BY DATE DATE REMARKS E V N E T D N O Ν ö aa. Metal Sheet Piling Χ 1.2 Pile Driving Equipment 1.2 Pulling and Redriving Х 1.2 Interlocked Joint Strength in Tension Χ Test 1.2 Materials Tests Χ 1.2 Driving

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TITLE AND LOCATION CONTRACTOR SPECIFICATION SECTION

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TITLE AND LOCATION SPECIFICATION SECTION CONTRACTOR East Grand Forks, Phase 2 Levees 02754

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			1.2	Paving Schedule		П	X		Ц		Ц	Χ											
			1.2	Concrete Mixture Proportions		Ц	\perp	Х	Ц		Ц		Χ										
			1.2	Testing		Ш	_	X	Ц	\perp	Ш	Χ											
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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 02763 GOVERNMENT ACTION CLASSI-CONTRACTOR CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES ACTION O I & N M F A C G O V A E P R E V SUBMIT TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL E M NEEDED NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY MENT CODE NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O Ν ö aa. Equipment Lists 1.2 Mixing, Thinning and Application 1.2 Qualifications 1.2 Material Tests 1.2 Volatile Organic Compound (VOC) Content

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CONTRACT NO.

TITLE AND LOCATION SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 02770 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F G O V A E P R E V SUBMIT TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY MENT CODE NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O N O aa. Concrete placement schedule 1.2 Χ **Concrete Mixture Proportions** 1.2 Testing 1.2 Concrete

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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 02870 GOVERNMENT ACTION CLASSI-CONTRACTOR CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES ACTION O I & N M F A C G O V A E P R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE С О NUMBER ITEM SUBMITTED BY MENT NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O Ν D E ö aa. Site Furnishings 2.5 Χ Site Furnishing Standards 3.1 Х Installation 1.2 Χ Materials 1.2 Recycled Material Χ Χ 2.4 Finish

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SPECIFICATION SECTION

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CONTRACT NO.

East Grand Forks, Phase 2 Levees CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL FICATION ACTION ACTION SCHEDULE DATES O I & N M F A C G O V A E P D R C A I R S R M R R A C E E E I A E A M W T D M P C M C N A I I U E O A P O U T O N O L N R T T E E D L O L S S S S S S S S S N Y I h. i. j. k. I. m. n. o R E V SUBMIT TRANS-SPECIFICATION APPROVAL MATERIAL TO GOVERN-E M PARAGRAPH NEEDED NEEDED MITTAL DESCRIPTION OF Ė W C 0 С О NUMBER ITEM SUBMITTED MENT NO. **SUBMIT** BY BY DATE DATE REMARKS E V N E T D E R N O Ν D E D E ö aa. Manufacturer's Literature 1.2 Experience for Native Grasses 1.2 Soil Test 1.2 Seed Test 1.2 Water Test 1.2 Certificates of Compliance 1.2 Samples Quantity Check 1.2 1.2 Maintenance Record 1.2 Seed Order for Native Grasses

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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 02930 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL FICATION ACTION ACTION SCHEDULE DATES O I & N M F A C G O V A E P R E SUBMIT ٧ TRANS-SPECIFICATION APPROVAL MATERIAL TO Ε PARAGRAPH NEEDED GOVERN-MITTAL **DESCRIPTION OF** NEEDED Ε C 0 С О M NUMBER ITEM SUBMITTED NO. **SUBMIT** BY BY DATE MENT DATE REMARKS E V N E T D W N O Ν E R D E D E ö aa. 1.2 Geotextile Х 1.2 Chemical Treatment Material Х 1.4.1 Delivery 3.2.1 Finished Grade, Topsoil and Χ **Underground Utilities** 1.2 Soil Test Χ Χ 3.1.4.1 Percolation Test Χ 2.1 Plant Material Х 2.2 Topsoil 2.3.2 Organic Material Χ Χ 2.4.1 Organic Mulch Х 2.10 Pesticide 1.4.1.3 **Delivered Topsoil** Х 2.4 Mulch 3.9 Plant Establishment Period 3.9.2.6 Maintenance Record Χ 3.7 Application of Pesticide 3.9.5 Maintenance Instructions

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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 02935 GOVERNMENT ACTION CLASSI-CONTRACTOR CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES ACTION O I & N M F G O V A E P R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION APPROVAL MATERIAL E M PARAGRAPH NEEDED NEEDED MITTAL DESCRIPTION OF Ė W C 0 С О NUMBER ITEM SUBMITTED MENT NO. SUBMIT BY BY DATE DATE REMARKS E V N E T D E R N O Ν D E D E ö aa. 1.2 Work Plan and Schedule 3.3.1 Χ Maintenance Record 1.2 Contractor's record of each site visit 1.2 Χ Soil Test 1.2 Percolation Test Χ

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East Grand Forks, Phase 2 Levees

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			1.2	Design	X							Χ											
				Form Materials	X				Ш			Χ											
			1.2	Concrete Formwork	X	-			Ш			Χ											
			1.2	Form Releasing Agents	$\perp \! \! \perp$	Х	\perp		\sqcup	\perp		Χ											
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East Grand Forks, Phase 2 Levees 03150 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL FICATION ACTION ACTION SCHEDULE DATES O I & N M F A C G O V A E P T S T T T M F O N R E SUBMIT ٧ TRANS-Τ SPECIFICATION APPROVAL MATERIAL TO E M PARAGRAPH NEEDED GOVERN-NEEDED MITTAL DESCRIPTION OF Ė W C 0 С О NUMBER ITEM SUBMITTED MENT NO. **SUBMIT** BY BY DATE DATE REMARKS E V N E T D N O Ν E R D E D E ö aa. Preformed Expansion Joint Filler Х 1.2 Sealant 1.2 Χ Waterstops 1.2 Waterstops 1.2 Preformed Expansion Joint Filler Sealant 1.2 Χ 1.2 Waterstops 1.2 Preformed Expansion Joint Filler 1.2 Sealant 1.2 Waterstops 1.2 Field-Molded Type Χ 1.2 Х Non-metallic Materials

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CONTRACT NO.

TITLE AND LOCATION SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 03200 GOVERNMENT ACTION CLASSI-CONTRACTOR CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES ACTION O I & N M F A C G O V A E P T S T T M F O N R U T N M F O R U H T R F S R M R A C E E E E I A E A M W T D M P C M C N A O D I I U E O A P O U T O A N O L N R T L R A I N T G N E T T E E D L O L A S S S S S S S S S N Y R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL E M NEEDED NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY DATE MENT CODE NO. SUBMIT BY DATE REMARKS E V N E T D N O N O aa. Concrete Reinforcement System 1.3 1.3 Χ Adhesive Anchors 1.3 Proprietary Rebar Mechanical Χ **Splices** 1.3 Welding 1.3 **Product Technical Data**

CONTRACT NO.

TITLE AND LOCATION

East Grand Forks, Phase 2 Levees

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SPECIFICATION SECTION

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			1.3	Concrete Mixture Design			X						Χ										
			1.3	Concrete Operation Plan	\prod	\prod	X	\Box		П		\Box	Х										
				Cold Weather Plan	\sqcap		X	_		П			Х										
			1.3	Hot Weather Plan			Х			П			Х										
			1.3	Joint Treatment Plan			X			П			Х										
			1.3	Concrete Testing Reports				IX		П		х											
			1.3	Manufacturer's Certificates				П	Х	П			Х										
			1.3	Batch Tickets				П	Х	П		х											
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			2.1.1	Simulated Stone Masonry	X	П		П	T	\Box	\neg	X										
			1.2	Panel	П	П	\top		x		Х											
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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 04200 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL FICATION ACTION ACTION SCHEDULE DATES O I & N M F A C G O V A E P R E SUBMIT ٧ TRANS-SPECIFICATION APPROVAL MATERIAL TO E M PARAGRAPH GOVERN-NEEDED MITTAL **DESCRIPTION OF** NEEDED Ε C 0 С О NUMBER ITEM SUBMITTED MENT NO. **SUBMIT** BY BY DATE DATE REMARKS E V N E T D W N O Ν E R D E D E ö aa. 2.3 Concrete Masonry Units (CMU) Х 1.2 **Burnished Concrete Masonry Units** 2.11 Х Insulation 3.1.2 Χ Cold Weather Installation 3.22.1 Field Testing of Mortar Χ Χ 3.22.2 Field Testing of Grout Χ 1.2 Masonry Cement Χ 1.2 Special Inspection 1.2 Insulation, Cavity Wall, 2-inch Thickness 2.3 Concrete Masonry Units (CMU) Χ **Burnished Concrete Masonry Units** Х 1.2 2.4 Stone Items Х 2.11 Insulation 1.2 Portable Panel

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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 05055 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL FICATION ACTION ACTION SCHEDULE DATES O I & N M F A C G O V A E P R E F S R M R H C N A A P O U T O T L R A I N E E D L O L S S S S N Y SUBMIT ٧ TRANS-SPECIFICATION APPROVAL MATERIAL TO Ε PARAGRAPH NEEDED GOVERN-MITTAL **DESCRIPTION OF** NEEDED C 0 С О Μ NUMBER ITEM SUBMITTED Ε **SUBMIT** BY BY DATE MENT DATE REMARKS NO. E V N E T D W N O Ν T T E S S S E R D D E ö E aa. Product Data Sheet 1.4 Х 1.4 **Detail Drawings** 1.4 Materials Orders 1.4 Materials List 1.4 Shipping Bill 1.4 Welding Procedures for Structural Steel 1.4 Welding of Aluminum 1.4 Structural Steel Welding Repairs 1.4 Fracture Control Plan (FCP) Χ 1.4 Tests, Inspections, and Verifications Test Reports for Fracture Critical Х 1.4 Members (FCM) 1.4 Qualification of Welders and Welding Operators 1.4 Application Qualification for Steel Studs 1.4 Welding of Aluminum 1.4 Materials Disposition Records

CONTRACTOR

CONTRACT NO.

TITLE AND LOCATION SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 05300 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF Ė W C 0 С О NUMBER ITEM SUBMITTED BY MENT NO. SUBMIT BY DATE DATE REMARKS E V N E T D E R N O N O D E D E aa. 2.1 Deck Units 2.1 **Deck Units** 2.5 Accessories 2.1 Deck Units

CONTRACT NO.

TITLE AND LOCATION CONTRACTOR SPECIFICATION SECTION East Grand Forks, Phase 2 Levees 05420 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF Ė W C 0 С О NUMBER ITEM SUBMITTED BY MENT NO. SUBMIT BY DATE DATE REMARKS E V N E T D E R N O Ν D E D E ö aa. 1.2 **Roof Trusses**

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TITLE AND LOCATION SPECIFICATION SECTION CONTRACTOR East Grand Forks, Phase 2 Levees 05500

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			1.2	Miscellaneous Metal Items	Пх		\Box	Τ				Х										
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SPECIFICATION SECTION

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East Grand Forks, Phase 2 Levees 06190 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY MENT CODE NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O Ν ö aa. **Design Calculations** 1.2 Χ Pre-engineered, shop-assembled wood roof trusses

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				Finish Carpentry	Х								Χ										
			1.2	Kiosk	Х								Х										
			1.2	Vanities	Х								Χ										
			1.2	Solid polymer material					Х				Х										
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CONTRACTOR SPECIFICATION SECTION TITLE AND LOCATION

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A C T I V I T Y N O a.	TRANS- MITTAL NO. b.	шZ ZO о́	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED e.	DRAWINGS g.	- NSTRUCT-ONS h.	STATE MENTS j.	REPORTS k.	CERTIFICATES I.	S A B C C F C C S m. n	O & M A A A A A A A A A A A A A A A A A A	I N	G	R E V I E W E R r.	SUBMIT s.		MATERIAL NEEDED BY u.	CODE v.	DATE w.	SUBMIT TO GOVERN- MENT	C O D E y.	DATE z.	REMARKS aa.
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SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 07466 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE С О NUMBER ITEM SUBMITTED BY MENT NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O N O D E aa. Manufacturer's Product Data 1.2 Χ Soffit and Fascia Drawings 1.2 Product Samples Χ

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			1.2	Steel Doors and Frames	X		Ť					X										
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CONTRACTOR

SPECIFICATION SECTION

CONTRACT NO.

East Grand Forks, Phase 2 Levees 08700 CONTRACTOR ACTION GOVERNMENT ACTION CLASSI-CONTRACTOR TYPE OF SUBMITTAL FICATION SCHEDULE DATES O I & N M F A C G O V A E P T S T T M F O R M R A C E E E E I A E A M W T D M P C M C N A O D I I U E O A N O L N R T L R A I N T G N E T T E E D L O L A S S S S S S S S S N Y R E V SUBMIT Τ TO GOVERN-TRANS-SPECIFICATION PARAGRAPH APPROVAL MATERIAL NEEDED E M NEEDED MITTAL DESCRIPTION OF E W E R CODE NUMBER ITEM SUBMITTED BY MENT CODE NO. SUBMIT BY DATE DATE REMARKS E V N E T D N O Ν ö aa. 1.2 Hardware List and Manufacturer's Data Х 1.2 Hardware 1.2 Hardware Schedule Χ 2.5.1 Keying Schedule Χ Χ 1.2 Hardware

CONTRACT NO.

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			2.1.1	Quarry Tile	X		\Box					X										
			2.1.2	Glazed Wall Tile	X							Χ										
			2.1.1	Quarry Tile	X							Х										
			2.1.2	Glazed Wall Tile	X							Х										
			2.1.1	Quarry Tile					Х			Х										
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CONTRACT NO.

SPECIFICATION SECTION TITLE AND LOCATION CONTRACTOR East Grand Forks, Phase 2 Levees 10170

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06/02

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SECTION 01410

ENVIRONMENTAL PROTECTION 06/02

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

The Contractor shall perform the work minimizing environmental pollution and damage as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract.

1.1.1 Subcontractors

The Contractor shall insure that its subcontractors comply with the requirements of this section.

1.1.2 Definitions

For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants.

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following items shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES.

SD-08 Statements

Environmental Protection Plan; GA.

The Environmental Protection Plan shall be prepared in accordance with PARAGRAPH: ENVIRONMENTAL PROTECTION PLAN.

1.3 ENVIRONMENTAL PROTECTION PLAN

1.3.1 Implementation.

Prior to ordering required materials/equipment or commencing construction work, the Contractor shall:

- a. Submit to the Contracting Officer an acceptable written Environmental Protection Plan;
- b. Obtain the Contracting Officer's written acceptance of the Environmental Protection Plan; and
- c. Meet with representatives of the Contracting Officer for the purpose of developing an understanding of the requirements and methods of administration of the Contractor's Environmental Protection Plan.

1.3.2 Compliance.

Not withstanding the requirements of this section and not withstanding approval by the Contracting Officer of the Contractor's Environmental Protection Plan, nothing herein shall be construed as relieving the Contractor of all applicable Federal, State, and local environmental protection laws and regulations.

1.3.3 Contents.

The Environmental Protection Plan shall include, but shall not be limited to, the following:

- a. Name(s) of person(s) within the Contractor's on-site organization who is(are) responsible for ensuring that the Environmental Protection Plan is adhered to.
- b. Meeting times and personnel attendance for communication and notification of personnel and subcontractors regarding environmental requirements, and name(s) of person(s) responsible for this training.
- c. The Contractor shall prepare a listing of resources needing protection, (i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, and historical, archaeological, and cultural resources); and what methods will be used to protect these resources.
- d. Name(s) of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.
- e. Procedures to be implemented to provide the required environmental protection, to comply with the applicable laws and regulations, and to correct pollution due to accident, natural causes, or failure to follow the procedures of the Environmental Protection Plan.
- f. Methods and locations for waste disposal. Licenses or permits shall be submitted for solid waste disposal sites that are not an operating commercial facility. Evidence of disposal facility acceptance shall be submitted for any hazardous or toxic waste.
- g. Drawings showing locations of any proposed temporary excavations

or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

- h. Environmental monitoring plans for the job site, including land, water, air, and noise monitoring.
- i. Traffic control plans.
- j. Methods of protecting surface and ground water during construction activities.
- k. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.
- 1. Drawing of borrow areas.
- m. Plans for restoration of landscape damage.
- n. Preconstruction damage surveys and reports as specified in SECTION 01000: $\mathtt{GENERAL}$.

1.4 PERMITS

Permits obtained by the Government related to the work of this contract, if any, are referenced in SECTION 01000: GENERAL. The Contractor is responsible for obtaining all applicable permits or licenses(those not obtained by the Government) including the General Stormwater Permits in Section: 01567 and Section: 01568. The Contractor shall be responsible for implementing the terms and requirements of the permits held by the Contractor or the Government. A copy of permits referenced in SECTION 01000: GENERAL, if any, are available for inspection in the Office of the District Engineer, Army Corps of Engineers Centre, 190 Fifth Street East, St. Paul, Minnesota 55101-1638.

1.5 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the previously mentioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's Environmental Protection Plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action when approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping (suspending) all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspensions. Failure of the Contracting Officer to notify the Contractor of any noncompliance with Federal, State, or local laws or regulations does not relieve the Contractor of the obligation to be in conformance with those requirements.

1.6 PREVIOUSLY USED EQUIPMENT

The Contractor shall thoroughly clean all construction equipment previously used at other sites before it is brought into the work areas, ensuring that soil residuals are removed and that egg deposits from plant pests are not present; the Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

1.7 PAYMENT

No separate payment or direct payment will be made for work covered under this section and such work will be considered as a subsidiary obligation of the Contractor.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 ENVIRONMENTAL RESOURCES.

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine its activities to areas defined by the drawings and specifications.

3.2 LAND RESOURCES

Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, earth or other material displaced into uncleared areas shall be removed.

3.2.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other

approved techniques.

3.2.3 Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Contracting Officer.

3.2.4 Disturbed Areas

The Contractor shall effectively prevent erosion and control sedimentation through approved methods including, but not limited to, the following:

- a. Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.
- b. Erosion and sedimentation control devices. The Contractor shall construct or install temporary and permanent erosion and sedimentation control features as indicated or required. Berms, dikes, drains, sedimentation basins, grassing, and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.
- c. Sediment basins. Sediment from construction areas shall be trapped in temporary or permanent sediment basins. The sediment basins shall be constructed in accordance with basin plans when shown on the drawings. The basins shall accommodate the runoff of a local 5 year storm, except that the design storm event required by the watershed district, watershed management board, or similar governing agency shall be used if available. After each storm, the basins shall be pumped dry and accumulated sediment shall be removed to maintain basin effectiveness. Overflow shall be controlled by paved weirs or by vertical overflow pipes. The collected topsoil sediment shall be reused for fill on the construction site, and/or stockpiled for use at another site. The Contractor shall institute effluent quality monitoring programs as required by State and local environmental agencies.

3.2.5 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Borrow areas shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil

intrusion into areas designated on the drawings and to prevent erosion of soil or sediment from entering nearby waters. Spoil areas shall be developed in accordance with the grading plan indicated on the drawings. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

3.3 WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation when such application may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction shall be the Contractor's responsibility. All water areas affected by construction activities shall be monitored by the Contractor.

3.3.1 Washing and Curing Water

Waste waters directly derived from construction activities shall not be allowed to enter water areas. Waste waters shall be collected and placed in retention ponds where suspended material can be settled out or the water evaporates to separate pollutants from the water.

3.3.2 Cofferdam and Diversion Operations

Construction operations for dewatering, and removal of cofferdams, shall be controlled at all times to limit the impact of water turbidity on the habitat for wildlife and on water quality for downstream use. The Contractor shall plan its operations and perform all work necessary to minimize adverse impact or violation of the water quality standards applicable to this contract.

3.3.3 Stream Crossings

Stream crossings shall be controlled during construction. Crossings shall provide movement of materials or equipment which do not violate water pollution control standards of Federal, State, or local governments.

3.3.4 Fish and Wildlife

The Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning of construction operations.

3.3.5 Fuel Handling

The Contractor shall provide containment around fueling areas to ensure that spills do not reach waters of the state.

3.4 AIR RESOURCES

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with

State air pollution statutes, rules, and regulations and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained. Monitoring of air quality shall be the Contractor's responsibility. All air areas affected by the construction activities shall be monitored by the Contractor.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

3.4.2 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

3.4.3 Odors

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

3.4.4 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall use methods and devices to control noise emitted by equipment to within the levels specified in the "Safety and Health Requirements Manual" referenced in the clause "Accident Prevention" in SECTION 00700: CONTRACT CLAUSES.

3.5 WASTE DISPOSAL

The Contracting Officer shall be informed of any waste disposal requirements identified during the work and not covered in the Environmental Protection Plan. Waste disposal plans shall be updated and submitted as required.

3.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers

which are emptied on a regular schedule. Handling and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Project Site and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.5.2 Chemical Wastes

Chemical waste shall be stored in corrosion resistant containers, removed from the work areas, and disposed of in accordance with Federal, State, and local laws and regulations.

3.6 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any have been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. The Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer.

3.7 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction.

3.8 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the neat lines of project features. Such restoration shall be in accordance with the Environmental Protection Plan. This work shall be accomplished at the Contractor's expense and at no additional cost to the Government.

3.9 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.10 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection. The training shall include methods of detecting and avoiding

pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities, devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

-- End of Section --

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06/02

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SECTION 01451

CONTRACTOR QUALITY CONTROL

06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1996) Minimum Requirements for Agencies
	Engaged in the Testing and/or Inspection
	of Soil and Rock as Used in Engineering
	Design and Construction
ASTM E 329	(1995b) Agencies Engaged in the Testing and/or Inspection of Materials Used in
	Construction

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Contractor Quality Control (CQC) Plan; GA

The quality control plan shall be prepared in accordance with PARAGRAPH: QUALITY CONTROL PLAN.

Laboratory Quality Management Manual; FIO

The manual as specified in PARAGRAPH: TESTS - TESTING LABORATORIES - CAPABILITY CHECK shall be submitted.

SD-18 Records

Documentation of work; FIO

- a. Construction Quality Control Management Report
- b. CQC Report

- c. Preparatory Phase Checklist
- d. Initial Phase Checklist

Daily records and weekly reports shall be prepared in accordance with PARAGRAPH: DOCUMENTATION

1.3 PAYMENT

The Contractor shall be responsible for the work for the work of this section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on site and off site, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 15 days after receipt of notice to proceed, the CQC Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both on site and offsite, including work by

subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent or someone higher in the Contractor's organization.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with SECTION 01330: SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on site and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the on site work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 2

years experience in related duties on construction similar to this contract. or a person with a minimum of 5 years experience in related duties on construction work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall not have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the CQC System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 Additional Requirement

In addition to the above qualifications, the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered through the Government in the Minneapolis - St. Paul, Minnesota metropolitan area.

3.4.4 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in SECTION 01330: SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work on site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, on site production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a testing laboratory meeting the requirements listed under PARAGRAPH: CAPABILITY CHECK, or establish a testing laboratory at the project site meeting those requirements. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and

comply with testing standards.

- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. It approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329. The Contractor shall submit a Quality Management Manual meeting the requirements of ASTM D 3740 and ASTM E 329 for each laboratory to be used, including on-site project laboratories.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$1000.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Contracting Officer. Coordination for each specific test, exact delivery location, and

dates will be made with the Contracting Officer.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence

that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

3.11 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM FOR CONTRACTOR QUALITY CONTROL OF CONTRACT

The Contractor shall utilize the Contractor Quality Control (CQC) module of the Resident Management System (RMS). The RMS-CQC module is a computer program which is executable on IBM compatible computers with 80386, 80486 and Pentium processors. This module includes a daily CQC reporting form which must be used. The module shall be completed to the satisfaction of the Contracting Officer prior to any contract payment and shall be updated as required. The Contractor shall complete module elements including:

Prime Contractor staffing

Subcontractor information, including name, address, trade, and point of contact

Submittal information, including description, activity number, review period, expected procurement period

Quality control testing

Definable features of work

Installed property listing

Transfer property listing

Pay activity and activity information

Planned cumulative progress earnings

Scheduled employee education required by the specifications

Insurance expiration dates

3.11.1 Revisions

The Contractor shall acknowledge receipt of Government comments relating to the RMS-CQC module by specific number reference on his Daily CQC report. The daily CQC report shall also report when corrections are implemented.

3.11.2 Pay Activity

The sum of all pay activity values shall equal the contract amount. Bid items may include multiple activities, but activities shall only be assigned to one bid item.

-- End of Section --

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SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

06/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-04 Drawings

Site Plan; FIO.

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

Government Field Office; FIO.

The Contractor shall submit a preliminary plan and description of the mobile office facilities which it proposes to furnish prior to proceeding with procurement thereof.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Temporary Electrical Facilities

The Contractor shall be responsible for coordination and costs for electrical power required for the Contractor's operations, including all costs for utility company hookup, installation/dismantling of transformers and distribution lines. In general, the Contractor shall establish it's own service connection with the utility company. If the Contractor proposes to use an existing Government service connection, a request shall be submitted for approval to verify the Contractor's use will not interfere with operation of the facilities, and the monthly service fees will be paid for in whole (including Government power consumption) by the Contractor.

1.2.2 Sanitation

The Contractor shall provide and maintain within the construction area

field-type sanitary facilities in accordance with EM 385-1-1. These facilities shall include but not be limited to toilet, washing, and drinking water facilities.

1.2.3 Telephone

The Contractor shall make arrangements and pay all costs for their telephone facilities desired. Government personnel will not take or deliver messages for the Contractor.

1.3 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flag men, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads.

1.3.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.3.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.4 CONTRACTOR'S TEMPORARY FACILITIES

1.4.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.4.2 Staging Area

The boundary limits of the grounds made available for the Contractor's use during the life of the contract are shown on the drawings as Work Limits. Trailers, materials, or equipment shall not be placed or stored outside the work limits.

1.5 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.

1.6 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of42-inches high, supported and tightly secured to steel posts located on maximum 10-foot centers, generally located to encompass the active construction areas, as directed by the Contracting Officer. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

1.7 PAYMENT

The Contractor shall be responsible for the work of this Section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS

2.1 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

2.1.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board

shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

2.1.2 Project and Safety Signs

The Contractor shall furnish and erect a Project sign and a Safety sign in a location selected by the Contracting Officer at the project site within 15 days after receipt of the notice to proceed. The requirements for the signs and their content shall be as shown on the drawings at the end of this section. The data required by the safety sign shall be corrected daily. Signs shall be maintained throughout the construction period, and upon completion of the project, the signs shall be removed from the site. The PROJECT DESCRIPTION and PROJECT NAME shall be as follows:

PROJECT DESCRIPTION: Flood Control Project

East Grand Forks, Minnesota

PROJECT NAME: Phase 2 Levees

2.2 GOVERNMENT FIELD OFFICE

The Contractor shall provide and maintain for the life of the contract an approved mobile office (mobile home style) meeting the following requirements as to space and facilities for the exclusive use of the government. The unit shall be ready for occupancy within 30 calendar days after notice to proceed. The unit shall provide a minimum of 400 square feet floor area and shall include two private offices, each having approximately 100 square feet of floor area and a storage closet. The unit shall have two entrance doors. The remaining space is to be utilized as one large office, a toilet room, a chest of drawers and a storage area for coats, etc. The unit shall be provided with a toilet room consisting of a stool and lavatory and an electric heater. The unit interior headroom shall be no less than a nominal 8'-0".

2.2.1 Location

The Contractor shall locate the portable mobile home type field office at or near the Contractor's field office site at a location approved by the Contracting Officer. Four parking spaces shall be reserved for Government vehicles at the Government trailer.

2.2.2 Construction.

The Government field office shall be similar in quality and age as the Contractor's field office, if provided. Exterior and interior finishes shall be free from color fade, chipping, or peeling. The unit shall be set level on blocking, be provided with plywood skirting, and be anchored to the ground for protection against wind damage. Exterior doors shall be provided with screens and outside hasps for use with padlocks. The unit shall be electrically wired for fluorescent ceiling lighting fixtures and weather proof porch lights at each entrance door, along with switches,

duplex convenience outlets, and a master switch and fuse box as required. The entire unit shall be adequately insulated with fiberglass insulation and vapor barrier. Dead air crawl space shall be properly ventilated. Heating and air conditioning facilities shall be provided to maintain an ambient inside temperature of 68 degrees F. The unit shall be weather proof, and furnished with a forced air type heating plant, either gas or oil with hot and cold air ducts adequate to supply even heat throughout the unit. Air conditioning shall be furnished with capacity as recommended by the manufacturer for the trailer size. A central air conditioning system shall be provided.

2.2.3 Utilities

The Contractor shall be responsible for service fees in connection with electrical power and heating (natural gas or oil service). The Contractor shall also be responsible for service fees in connection with the water supply, sanitary waste system, and telephone as indicated below. When available, city water and sewer system connections are preferred.

- a. Sanitary Facilities. In the absence of a city sewer connection, holding tanks shall be provided. The lavatory shall discharge into an outside underground holding tank with a capacity of not less than 400 gallons and a vented drain. The Contractor shall provide year-round pumping of the holding tank as required. Subject to approval, a serviced chemical toilet may be used.
- b. Potable Water. In the absence of a city water connection, a potable water storage tank of not less than 300 gallons capacity shall be furnished with adequate supply filling connections and screened vent, and shall be stainless steel or plastic with a drain cock of not less than ½ inch. Upon completion of the job, the Contractor shall remove the underground holding tank and backfill the excavation. The Contractor shall provide potable water for the storage tank if service connections are not provided.
- c. Telephone. The Contractor shall be responsible for installation of telephone at the Government office. The telephone hook-up should be placed on a separate account from the Contractor's phone so that it can be transferred to the Government after installation. The Government will be responsible for the telephone service to the Government field office after installation.

2.2.4 Furnishings.

The following furnishings shall be provided for the Government office:

- a. A hot and cold drinking water dispenser. The Contractor shall provide drinking water for the dispenser for the duration of the contract.
- b. Bulletin board, minimum size 6 square feet.
- c. A cabinet shall be supplied along a side wall with minimum nominal dimensions 2 feet wide, 3 feet high and 6 feet long. The cabinet shall include a finished wood or laminate counter. Two shelves, one above

and one below the cabinet, shall be provided for storage.

- d. Sign. The Contractor shall securely attach to the unit exterior and adjacent to the main entrance door, as approved, a 24 inch by 36 inch sign with the Corps of Engineers castle insignia with wording as specified.
- e. Stoop. A stoop with 8 inch risers and handrails shall be provided at each entrance door.
- f. Windows. All windows shall be provided with sash and security screens along with shades, blinds or similar features that allow for the complete coverage of the windows on the inside.
- g. Lavatory. A 5 by 24 inch metal shelf and 15 by 20 inchwood or metal framed plate glass mirror shall be provided above the lavatory.

2.2.5 Furniture

Office furniture shall be coordinated with respect to style, color, and upholstery. The following furniture shall be provided:

- a. Two desks either wood or steel, double pedestal type, top approximately 60 inches by 34 inches, with lock.
- b. Two swivel armchairs with tilting seat and adjustable spring back.
- c. Two filing cabinets, four-drawer legal size, with lock.
- d. One drafting table stool, non-tilting, rotary type with back and circular footrest.
- e. One drafting table, metal and/or wood, 36 inches by 48 inches.
- f. One conference table, 3/4 inch thick by 72 inches long by 36 inches wide with solid core construction top.
- g. Eight chairs for conference table, either wood or steel construction, with cushioned seat and backrest.
- h. One rack for hanging full size drawings.

2.2.6 Office Equipment

The following equipment shall be provided:

- a. One desk top facsimile (FAX) machine with modem BPS speeds of 9600,7200,4800, and 2400; an effective scanning width of 11.7 inches and line scanning density of 8 pels/mm horizontal and an effective scanning width of 7.7 inches and line scanning density of 3.85 lines/mm vertical. Initially supply four reams of paper(500 sheets per ream).
- b. One desk top copying machine with an indirect dual component dry tone process. Paper copy sizes shall be a maximum of 11 inches by 17

inches and a minimum of 4.25 inches by 5.5 inches. The machine shall have a halogen lamp light source and an automatic sheet feed (single cassette). Initially supply four reams (500 sheets per ream) of white copying paper and furnish a complete maintenance service contract/agreement for the machine.

- c. One personal computer, minimum 433 megahertz, 4 gigabyte hard drive, 64 megabyte of RAM, CD ROM Reader; 17" monitor (26 dot pitch maximum), mouse and keyboard. The software provided with the computer will be Microsoft "Windows 95" or better and Microsoft "Office Professional" or approved equivalent.
- d. One laser printer, HP 4000N or approved equivalent.

2.2.7 Maintenance.

The Contractor shall maintain the field office for the life of the contract. The Contractor shall be responsible for maintaining and paying for all costs associated with the following services:

- a. Supplies. Toilet paper, paper toweling, paper and supplies for the FAX and copy machines shall be provided. Supply water for the drinking water dispenser. Supply water for the lavatory if a service connection is not provided for potable water.
- b. Maintenance of office equipment. Include a maintenance service contract/agreement for operation of the Fax and Copy machines.
- c. Janitorial Service. The Contractor shall provide daily janitorial service and provide all janitorial and sanitary supplies as well as trash removal service.
- d. Snow removal. Maintenance of site access including snow removal service is the responsibility of the Contractor.
- e. Utilities. The Contractor is responsible for maintaining and paying all costs assocated with utility services including water supply, sanitary waste system, electrical power and natural gas or oil service.

2.2.8 Additional Requirements

- a. The Contractor shall locate the portable mobile home type field office as directed by the Contracting Officer.
- b. Four (4) parking spaces shall be reserved for Government vehicles at the Government trailer. If the Contractor requires more space, the Contractor shall prvide it at his own expense.

PART 3 EXECUTION

3.1 CLEANUP

Construction debris, waste materials, packaging material and the like shall

be removed from the work site. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

3.2 RESTORATION OF STORAGE AREA

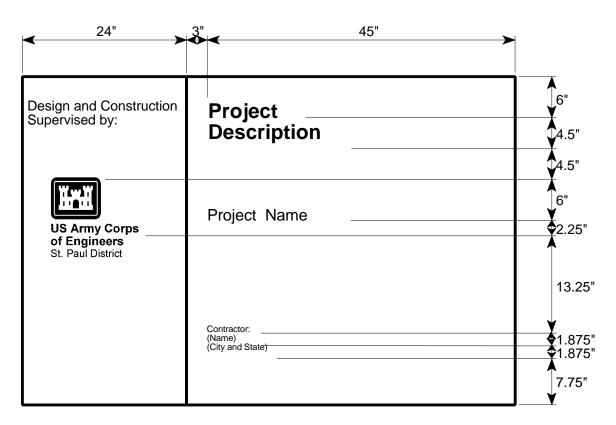
Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

3.3 ATTACHMENTS

- 1. Project Sign
- 2. Safety Sign
- 3. Sign Erection Details
 - -- End of Section --

PROJECT SIGN

The graphic format tor this 4' x 6' sign panel follows the legend guidelines and layout as specified below. The large 4' x 4' section of the panel on the right is to be white with black legend. A 2' x 4' decal provided by the Corps shall be placed on the left side of the sign panel.



Project Description:

One to three line project title legend describes the work being done under this contract.

Color: Black; Typeface: 3" Helvetica Bold; Maximum line length: 42".

Project Name:

One to three line identification of project or facility.

Color: Black; Typeface: 1.5" Helvetica Bold; Maximum line length: 42".

Cross-align the first line of PROJECT NAME with the first line of the Corps Signature as shown.

Contractor:

One to five line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state.

Color: Black; Typeface: 1.25" Helvetica Bold; Maximum line length: 21".

All typography is flush left and ragged right, upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps Standards (EP 310-1-6a and 6b).

SAFETY SIGN Safety is a Job Requirement 12" Public Use Area Development, Stage IV Osage River Basin 2.25 3' **Pacific Marine Construction Corporation** 2.25" Galveston, Texas 3"4 This project started 9 1 Date since last lost time accident Total lost time injuries 0 21" 24"

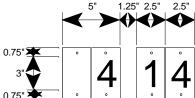
All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps Standards (EP 310-1-6a and 6b).

Legend Group 1: Standard two-line title "Safety is a Job Requirement" with (8" od.) Safety Green First Aid logo. Typeface: 3" Helvetica Bold; Color: Black.

Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

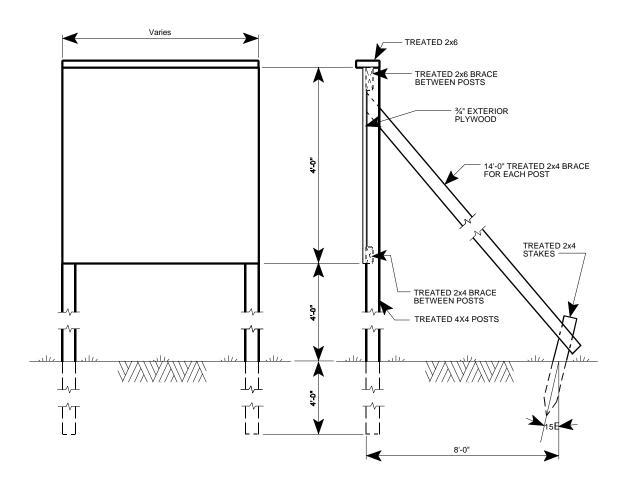
Legend Group 3: One- to two-line identification: name of prime contractor and city, state address. Typeface: 1.5" Helvetica Regular; Color: Black; Maximum line length: 42".

Legend Group 4: Standard safety record captions as shown. Typeface: 1.25" Helvetica Regular; Color: Black.



Replaceable numbers are to be mounted on white 0.060 aluminum plates and screw-mounted to background. Typeface: 3" Helvetica Regular; Color: Black; Plate size: 2.5" x 4.5".

SIGN ERECTION DETAILS



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SECTION 01567

MINNESOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM 06/02

PART 1 GENERAL

1.1 GENERAL

This section covers best management practices to be implemented for prevention of storm water pollution as required by the National Pollutant Discharge Elimination System (NPDES). The Minnesota Pollution Control Agency is responsible for administering permits for NPDES in the state of Minnesota. The Government has determined that the project work included under this contract requires NPDES permitting. The requirements herein supplement those covered in SECTION 01410: ENVIRONMENTAL PROTECTION.

1.1.1 Definitions

The following terms apply to this specification and the general permit, unless redefined in subsequent paragraphs.

- a. "Plan" means the Temporary Erosion and Sediment Control Plan.
- b. "EPA" means the United States Environmental Protection Agency.
- c. "MPCA" means the Minnesota Pollution Control Agency.
- d. "NPDES" means the National Pollutant Discharge Elimination System.
- e. "MPDES" means the Minnesota Pollutant Discharge Elimination System.
- f. "Owner" as referred to in the general permit shall mean the Federal Government.
- g. "Permittees" as referred to in the general permit shall mean the Federal Government and Contractor.
- h. "General Permit" means the general permit authorization to discharge storm water associated with a construction activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.
- j. "BMP" means Best Management Practices.

1.1.2 Contract Drawings

The following features are shown on or can be determined from the contract drawings:

a. The drainage patterns and approximate slopes anticipated after the major grading activities.

- b. Areas of soil disturbance.
- c. The location(s) where stabilization practices are expected to occur.
- d. Typical details showing suggested Best Management Practices (BMP's) for erosion and sediment control.
- e. Waters of the State.
- f. Final site stabilization.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA/832/R-92/005	Storm Water Management for Construction
	Activities - Developing Pollution
	Prevention Plans and Best Management
	Practices

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT)

MNDOT 3885	Standard Specifications for Construction (1995 Edition), Erosion Control Blankets
MNDOT 3886	Standard Specifications for Construction (1995 Edition), Silt Fence
MNDOT 3887	Standard Specifications for Construction (1995 Edition), Flotation Silt Curtain

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Temporary Erosion And Sediment Control Plan; FIO.

A specific Temporary Erosion and Sediment Control Plan shall be submitted in accordance with PARAGRAPH: PERMIT COMPLIANCE AND ADDITIONAL REQUIREMENTS.

SD-18 Records

Application; GA.

A copy of the Application for General Storm Water Permit for Construction Activity (MPCA Form PQ00641) shall be submitted to the Contracting Officer at the same time it is transmitted to the state.

Notice of Termination; FIO.

A copy of the notice of termination shall be submitted to the Contracting Officer at the same time it is transmitted to the state.

1.4 PERMIT COMPLIANCE AND ADDITIONAL REQUIREMENTS

The Contractor shall comply with the requirements of General Permit No. MNR100000. The following define additional requirements and clarify which requirements of the General Permit are to be performed by either the Contractor, the Government, or both.

1.4.1 Schedule

No contract project construction activities which requires an NPDES permit may commence until the MPDES permit is valid.

1.4.2 Temporary erosion and sediment control plan

The contract drawings show a typical details of suggested best management practices (BMP's) for erosion and sediment control taken from EPA/832/R-92/005. The BMP's, together with applicable portions of the site drawings and specifications form an initial plan for temporary erosion and sediment control. The Contractor shall finalize and implement the plan. The finalized plan, together with documentation, shall be in accordance with the general permit. The plan shall be maintained at the site and made available to federal, state, and local officials as requested. The Contractor shall determine the specific BMP's for erosion and sediment control (including the types, locations, and installation scheduling of erosion and sediment controls). These BMP's and corresponding material specifications and shop drawings shall be included in the Plan.

1.4.3 Application

The Application for General Storm Water Permit for Construction Activity must be signed by the Government and the Contractor. A blank copy of the application form is included at the end of this section. Immediately after contract award, the Contractor shall complete parts I, II and V of the application form, obtain signature by the Government, and submit the form to the state. The application shall be post marked at least 48 hours in advance of any ground breaking activities. The Contractor is responsible for payment of the application fee.

1.4.4 Permanent erosion and sediment control plan

The Government has developed the Permanent Erosion and Sediment Control Plan and will maintain availability of the plan to federal, state, and local officials as required in the General Permit.

1.5 MEASUREMENT AND PAYMENT

The contactor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS

2.1 SILT FENCE

Silt fence shall be manufactured and installed as shown on drawings. On level sites with minimal potential for sediment loading, the wire fabric may be omitted. Fabric for silt fence shall conform to requirements given in MNDOT 3886.

2.2 STRAW BALES

Straw shall be baled from oats, wheat, rye, barley, rice, or other coarse fiber vegetation that will percolate water. Hay baled from grass, alfalfa and clover is not acceptable.

2.3 OTHER PRODUCTS

Any products proposed for use that are not included on drawing Z2-22 shall be described fully, with catalog cuts and manufacturer's instructions for use, in the temporary erosion and sediment control plan. Other products, if proposed in the final plan, shall meet the following requirements:

Erosion control blankets shall meet MNDOT 3885 Floatation Silt Curtain shall meet MNDOT 3887

PART 3 EXECUTION

As between the Government and the Contractor, the Contractor shall be responsible for fulfilling the obligations of the general permit for the following sections:

Part I-C: Records

Part I-D: Erosion and Sediment Control During Construction

Part I-E: Inspection and Maintenance

Appendix A: Temporary Erosion and Sediment Control Plan

3.1 IMPLEMENTATION

The Contractor shall install the sediment and erosion control system in accordance with the plan submitted to the Contracting Officer. The BMP's shall be modified if inspection indicates distress to the system or reveals unforeseen circumstances, or if directed by the Contracting Officer. Any updates to the plan shall be recorded. Permanent stabilization shall be initiated as soon as practicable in any portion of the site where construction activities are complete.

3.2 MAINTENANCE

The Contractor shall be responsible for implementing and managing the erosion and sediment control BMP's before and during the construction activities; and ensure that the Plan will be implemented and stay in effect until the work has been completed, the entire work site has undergone final stabilization, and a Notice of Termination has been submitted to the Contracting Officer and the state permitting authority.

3.3 RECORDS

The contractor shall record on CQC reports: (1) dates when major stripping and grading activities occur, (2) dates when construction activities temporarily or permanently cease on a portion of the site,(3) when permanent stabilization practices are initiated, and (4) activities associated with inspection and maintenance.

3.4 ATTACHMENTS

- 1. Application for General Storm Water Permit for Construction Activity (MDNR Form PQ00641 with instructions) 4 Pages
- 2. NPDES General Permit No. MN R100000 21 Pages
- -- End of Section --



Application for General Storm Water Permit for Construction Activity (#MNR100000)



Minnesota Pollution Control Agency 520 Lafayette Road North; St. Paul, MN 55155-4194

	i. Construct	ion Site information		
1.	Name of project:			
2.	Brief description of v	where the construction activity occurs	(please include address, if	`available):
3.	Indicate ALL cities,	counties, and townships where the co	nstruction activity will tak	te place:
4.	Name of waterbody(s	s) that will receive storm water from t	he construction site:	
5.	Project start date:	Project completion date:	Area to be disturbed by pr	roject:(in acres)
	II. Prerequisite	s for Applying for a Permit		toyan katalon ka
Fo	or the following question	ons, please refer to the NPDES Gene	eral Storm Water Permi	t (MNR100000).
A iss	" No " answer for any q sued to authorize the o	question will result in this form being construction activity. This application ermit to authorize the construction act	returned to the owner with will need to be completed	h no permit
6.		Erosion and Sediment Control Placerdance with Appendix A and incorposite fications?	-	Yes No
7.		Erosion and Sediment Control Placerdance with Appendix B and incorpositions?		Yes No
8.	Has the Application	Fee been enclosed?		Yes No
100	III. Owner info	mation	and the second of the second	
_ Na	me		Telephone	
Ado	dress			
City	y		State	Zip Code
Col	ntact Person		Telephone	

IV. Owner Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete (Minnesota Rules part 7001.0070).

I also certify under penalty of law that I have read, understood, and accepted all terms and conditions of the National Pollutant Discharge Elimination System (NPDES) General Storm Water permit (MNR100000) that authorizes storm water discharges associated with the construction site identified on the front side of this form.

I understand that as a permittee, I am legally accountable under the Clean Water Act, to ensure compliance with the terms and conditions of the NPDES General Storm Water Permit (MNR100000).

I also understand that MPCA enforcement actions (pursuant to Minnesota Statutes sections 115.07, 116.072, and 609.71 and Section 309 of the Clean Water Act) may be taken against my company if the terms and conditions of the NPDES General Storm Water Permit (MNR100000) are not met.

Printed Name	Title (Manager, CEO, etc.)
Authorized Signature	Date

V. General Contractor Certification

I certify under penalty of law that I have read, understood, and accepted all terms and conditions of the National Pollutant Discharge Elimination System (NPDES) General Storm Water permit (MNR100000) that authorizes storm water discharges associated with the construction site identified on this form.

I understand that for Parts I.B. through I.E, Appendix C, and Appendix D of the General Storm Water Permit (MNR100000) I am becoming a co-permittee with the owner of the facility for which I have been contracted to perform professional construction services. As a co-permittee I understand that my company is legally accountable, under the Clean Water Act, to ensure compliance with the terms and conditions of the General Storm Water Permit (MNR100000).

I also understand that MPCA enforcement actions (pursuant to Minnesota Statutes sections 115.07, 116.072, and 609.71 and Section 309 of the Clean Water Act) may be taken against my company if the terms and conditions of the NPDES General Storm Water Permit (MNR100000) for which I am a co-permittee, are not met.

Company or Firm			Telephone
Printed Name			Title (Manager, CEO, etc.)
Authorized Signature			Date
Address			
City	State	Zip Code	
Contact Person			Telephone



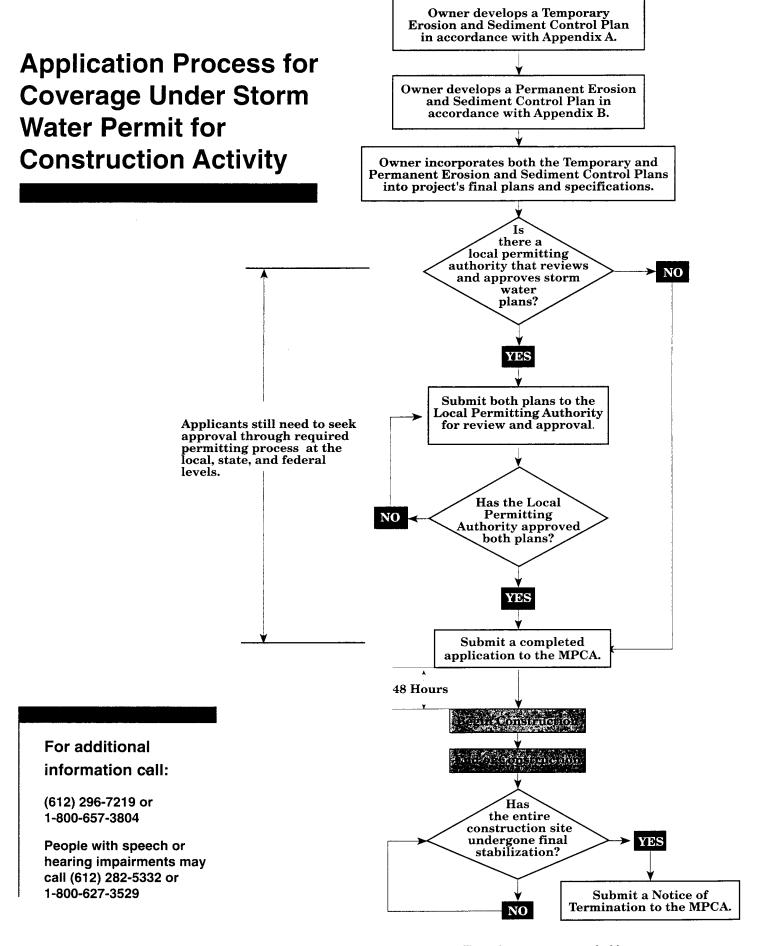
Application Instructions for General Storm Water Permit

CONSTRUCTION ACTIVITY



Minnesota Pollution Control Agency

520 Lafayette Road North St. Paul, MN 55155-4194



Page 1 of 21

Permit No: MN R110000



Minnesota Pollution Control Agency

GENERAL PERMIT

AUTHORIZATION TO DISCHARGE

STORM WATER ASSOCIATED WITH A CONSTRUCTION

ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION

SYSTEM/STATE DISPOSAL SYSTEM PERMIT PROGRAM

ISSUANCE DATE: September 4, 1998

EXPIRATION DATE: September 4, 2003

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.; hereinafter, the "Act"), 40 CFR 122, 123, and 124, as amended, et seq.: Minnesota Statutes Chapters 115 and 116, as amended, and Minnesota Rules Chapter 7001:

This permit establishes conditions for discharging storm water to waters of the state from construction activities which disturb five or more acres of total land area.

This permit DOES NOT authorize:

- 1) Discharges or releases that are not storm water as defined on Page 18 (see "Prohibitions" on Page 14 of this permit).
 - 2) The placement of fill into waters of the state.

Unless notified by the Agency to the contrary, applicants who submit a complete application form in accordance with the requirements of this permit are authorized to discharge storm water from construction sites under the terms and conditions of this permit 48 hours after the date the application is postmarked

Coverage under this permit will remain in effect until construction is complete, the site has undergone final stabilization; all maintenance activities required in Part I.E. have been completed, and the Permittee has submitted a Notice of Termination, regardless of the above expiration date.

Signature:

Shn N. Holck Manager

Military Military

South District

Operations & Planning/Major Facilities

Peder A. Larson.

Commissioner :

Minnesota Pollution Control Agency

If you have questions on this permit, including the specific permit requirements, permit reporting or permit compliance status, please contact:

Minnesota Pollution Control Agency Metro District, Storm Water Permit Program 520 Lafayette Road North St. Paul, MN 55155-4194 Telephone (651) 296-3890 Fax (651) 297-8701

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I. REQUIREMENTS OF THIS PERMIT

A. PREREQUISITES FOR SUBMITTING A PERMIT APPLICATION

Failure to complete the following prerequisites prior to submitting the application will result in the application being returned, and the construction project NOT authorized by this permit.

- 1. The owner must develop a Temporary Erosion and Sediment Control Plan in accordance with "Appendix A." The plan requirements must be incorporated into the project's final plans and specifications and implemented as part of the project.
- 2. The owner must develop a Permanent Erosion and Sediment Control Plan in accordance with "Appendix B." The plan requirements must be incorporated into the project's final plans and specifications and implemented as part of the project.

The above plans are $\underline{\text{NOT}}$ to be submitted to the Agency but are to be retained by the owner in accordance with Appendices A and B; "Plan Retention."

B. APPLICATION FOR COVERAGE

- 1. The owner and general contractor are responsible for submitting a completed application form (or a photocopy thereof) to the Minnesota Pollution Control Agency (MPCA) for each project which disturbs five (5) or more acres of land.
- 2. The owner who signs the application is responsible for compliance with all terms and conditions of this permit. The general contractor who signs the application is a Co-Permittee for Parts I.B. through I.E., Appendix C, and Appendix D of this permit. and is responsible for compliance with those portions of this permit.
- 3. This permit will become effective 48 hours after the postmarked date of the completed application form containing "Yes" responses to questions 6, 7, and 8. A "No" response to question 6, 7, or 8 will result in the application being returned to the owner, and no permit will be issued to authorize the construction. No construction which requires an NPDES permit may commence unless authorized by an NPDES permit.
- 4. Permittees will receive a "Notice of Storm Water Permit Coverage" card acknowledging permit coverage within 30 days of the postmarked date of the completed application. (See I.D.3. for posting requirements.) A photocopy of this card must be provided by the owner to the local permitting authority, where applicable, within 14 days of receipt.

C. RECORDS

- 1. The project's **final plans and specifications** which incorporate the requirements of the Temporary Erosion and Sediment Control Plan and Permanent Erosion and Sediment Control Plan must be:
 - a. available at the construction site in either the field office, or, inspector's vehicle, or contractor's vehicle, and,
 - b. available to federal, state, and local officials (in accordance with Appendix D, Subpart C) for inspection for the duration of this permit.
- 2. The following plans/records must be made available to federal, state and local officials within 24 hours of request (in accordance with Appendix D, Subpart C.) for the duration of the permit:
 - a. Temporary Erosion and Sediment Control Plan developed in accordance with Part I.A.1. (if a separate document from the project's final plans and specifications).
 - b. Permanent Erosion and Sediment Control Plan developed in accordance with Part I.A.2.
 - c. Records of all inspections (see Part I.E.). Records shall include:
 - 1) Date and time of inspections,
 - 2) Findings of inspections,
 - 3) Corrective actions taken (including dates and times)
 - 4) Documentation of changes to the Temporary Erosion and Sediment Control Plan made during construction.
 - d. Date of all rainfall events.
- 3. The "Notice of Storm Water Permit Coverage" card shall be posted at any of the following locations:
 - a. construction site entrance and visible from the nearest public roadway
 - b. visible from the nearest public roadway, where no construction site entrance exists
 - c. field office (if applicable)
 - d. for linear utility and non-contiguous municipal projects, at the office responsible for project administration.

D. EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

1. Erosion Control

- a. The **Permittee(s)** shall use, where possible, horizontal slope grading, construction phasing, and other construction practices that minimize **erosion**.
- b. Unless precluded by snow cover, all exposed soil areas*
 with a continuous positive slope within 100 lineal feet
 from a water of the state, or from a curb, gutter, storm
 sewer inlet, temporary or permanent drainage ditch or other
 storm water conveyance system, which is connected to a
 water of the state, shall have temporary protection or
 permanent cover for the exposed soil areas within the
 following time frames:

Type of Slope

Temporary protection or permanent cover where the area has not been, or will not be, worked by the

contractor for:

Steeper than 3:1 7 days

10:1 to 3:1 14 days

Flatter than 10:1 21 days

*For the purposes of this provision, exposed soil areas do not include stockpiles or surcharge areas of sand, gravel, aggregate, concrete or bituminous.

- c. The bottom of any temporary or permanent drainage ditch constructed to drain water from a construction site must be stabilized within 100 lineal feet from a water of the state. Stabilization must be initiated within 24 hours of connecting the drainage ditch to a water of the state, existing gutter, storm sewer inlet, drainage ditch, or other storm water conveyance system which discharges to waters of the state and completed within five calendar days.
- d. Prior to connecting any pipe to a water of the state or drainage ditch, the pipe's outlet must be provided with temporary or permanent energy dissipation to prevent erosion.

2. Sediment Control

- a. Sediment control best management practices (BMPs), which prevent sediment from entering a water of the state, gutter, storm sewer inlet, ditch or other storm water conveyance system, shall be established on all down-gradient perimeters before any up-gradient land disturbing activities begin, and shall remain in place until final stabilization has been established.
- b. The Permittee shall minimize vehicle tracking of **sediment** or **soil** off site at locations where vehicles exit the construction site onto **paved surfaces**.
- c. Where 10 or more contiguous acres of **exposed soil** are contributing to a discernible point of **discharge**, temporary sedimentation basins* must be provided prior to the runoff leaving the construction site or entering waters of the state.

These sedimentation basins shall comply with the following:

- 1) Basins shall provide 1800 ft³ per acre drained of hydraulic storage below the outlet pipe. For roadways, the use of adjacent drainage ditches with riser pipes to accomplish this is acceptable.
- 2) Basin outlets shall be designed to prevent short circuiting and the **discharge** of floating debris. The outlet should consist of a perforated riser pipe wrapped with filter fabric and covered with crushed gravel. The perforated riser pipe should be designed to allow complete basin drawdown.

*While recommended, this provision will not be required for:

- 1) work on existing roadways where the 10 acre disturbed common drainage area is served by an existing storm sewer which is daylighted off the road's right-of-way, or.
- proximity to bedrock or vertical relief precludes it, or,
- 3) final stabilization will be established within 30 days of the initiation of construction activity.

E. INSPECTIONS AND MAINTENANCE

- 1. Except where work has been suspended due to frozen ground conditions, the Permittee(s) shall inspect the construction site once every seven (7) days and within 24 hours after every rain event, which results in runoff leaving the construction site or entering waters of the state. The Permittee shall investigate and comply with the following inspection and maintenance requirements:
 - a. <u>Inspection Requirement</u>: All **erosion** and perimeter **sediment control BMPs** to ensure integrity and effectiveness.

Maintenance Requirement: All nonfunctional perimeter sediment control BMPs shall be repaired when the sediment reaches 1/3 of the height, or replaced, or supplemented with functional BMPs within 24 hours of discovery. All nonfunctional erosion control BMPs shall be repaired, replaced, or supplemented with functional BMPs as soon as field conditions allow access.

b. <u>Inspection Requirement</u>: All temporary sedimentation basins to ensure effectiveness.

Maintenance Requirement: When the depth of sediment collected in the basin reaches 1/2 the height of the riser, or 1/2 the storage volume, the basin shall be drained and the sediment removed. Drainage and removal shall be completed within 72 hours of discovery, or as soon as field conditions allow access.

c. <u>Inspection Requirement</u>: Drainage ditches and other waters of the state for evidence of sediment leaving the site.

Maintenance Requirement: Unless the project has received approval or certification for depositing fill into waters of the state, the Permittee shall remove all deltas and sediment deposited in drainage ways, catch basins, or waters of the state, and restabilize the areas where sediment removal results in exposed soil. The removal and stabilization shall take place within seven (7) days of discovery unless precluded by legal, regulatory, physical access restraints. If precluded, removal and stabilization must take place within seven calendar days of The Permittee is responsible for obtaining access. contacting all local, regional, state and authorities prior to working in waters of the state, and receiving any applicable permits.

d. <u>Inspection Requirement</u>: Construction site vehicle exit locations for evidence of off-site **sediment** tracking onto paved **surfaces**.

Maintenance Requirement: Tracked sediment shall be removed from paved surfaces, which do not drain back into the construction site, within 24 hours of discovery.

- 2. Where parts of the construction site have undergone final stabilization, but work remains on other parts of the site, inspections of the stabilized areas may be reduced to once per month.
- 3. Where work has been suspended due to frozen ground conditions, the inspections and maintenance required in Part I.E.1. above shall take place as soon as weather conditions warrant or prior to resuming construction.
- 4. Unless required to remain in place by the owner or local permitting authority, all temporary synthetic, structural, and nonbiodegradable erosion and sediment control BMPs shall be removed after the site has undergone final stabilization.
- 5. After the entire project has undergone final stabilization, all temporary sedimentation basins to be used as permanent water quality management basins must be cleaned out by the Permittee to provide the sediment storage capacity required in Part I.D.2.c.2. Permittees are responsible for the maintenance of water quality management BMPs until construction is complete, the site has undergone final stabilization, and a Notice of Termination has been submitted to the Agency.

F. DURATION OF PERMIT COVERAGE

The owner and general contractor are responsible for complying with their respective portions of this permit until construction is complete, all maintenance activities required in Part I.E. are complete, the site has undergone final stabilization and a Notice of Termination is submitted to the Agency.

G. APPENDICES INCORPORATED BY REFERENCE

Appendices A, B, C, and D are incorporated into this permit by reference and are made both integral and enforceable parts of this permit.

Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A

APPENDIX A

TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

(Completed prior to submittal of an application)

A. GOAL: The goal of the Temporary Erosion and Sediment Control Plan is to prevent sediment from entering waters of the state during construction. The owner shall incorporate Best Management Practices (BMPs) into the project's final plans and specifications, which are designed to meet this goal and comply with Parts I.D. and I.E. of this permit. While the general requirements are identified in Parts I.D. and I.E. of this permit, it is the owner's responsibility to select the appropriate BMPs which satisfy these requirements.

B. ASSIGNING RESPONSIBILITY

When developing bidding documents or other contracts, the **owner** must identify who will implement and manage the **erosion** and **sediment control BMPs** before and during construction; and ensure that the plan will be implemented and stay in effect until the construction project is complete, the entire site has undergone **final stabilization**, and a **Notice of Termination** has been submitted to the Agency. In addition, the **final plans and specifications** must clearly identify who will be responsible for the maintenance requirements identified in Part I.E. of this permit.

C. PLAN CONTENTS

The Temporary Erosion and Sediment Control Plan, if developed as a document separate from the project's final plans and specifications, must be prepared for the proposed project. The plan must contain appropriate BMPs which comply with Parts I.D. and I.E. of this permit and contain standard plates and/or specifications of these BMPs.

- 1. Standard plates and/or specifications must be provided for all BMPs, selected by the designer to be used on the project, and at a minimum, must include the following:
 - a. perimeter sediment control
 - b. placement and type of temporary cover
- Where applicable, standard plates and/or specifications must also be provided for the following:
 - a. horizontal slope grading
 - b. proposed stabilized vehicle entrances
 - c. temporary sedimentation basins
 - d. storm sewer pipe outlet energy dissipation
 - e. storm sewer inlet control
 - f. erosion and sediment control requirements for stockpile areas

The above standard plates and/or specifications are to be incorporated into the project's final plans and specifications. In addition, the final plans and specifications shall clearly denote:

- 1. Location and type or the procedures to establish the location and type of all erosion and sediment control BMPs.
- 2. Existing and final grades, including dividing lines and direction of flow for all **storm water** runoff drainage areas located within the project limits.
- 3. Locations of areas not to be disturbed or areas where construction will be staged to minimize duration of exposed soil areas.
- 4. All waters of the state, including existing wetlands identified on the National Wetlands Inventory Map, within one-half mile from the exposed construction area which will receive direct storm water runoff from the construction site during construction.

Where waters of the state, including wetlands, which will receive the direct runoff will not fit on a plan sheet, they shall be identified with an arrow, indicating both direction and distance.

5. Timing for installation of all erosion and sediment control BMPs required in Part I.D.

E. PLAN RETENTION

Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A Appendix A

The owner shall keep a copy of the Temporary Erosion and Sediment Control Plan and all changes to it for three years after completion of the construction project.

F. CHANGES TO THE TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

Changes in the plan made during construction to accommodate phased construction, sequenced work, timing issues, or changed site conditions are allowable provided Parts I.D. through I.E. are complied with.

Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B

APPENDIX B

PERMANENT EROSION AND SEDIMENT CONTROL PLAN

(Completed prior to submitting an application)

A. GOAL: The goal of the Permanent Erosion and Sediment Control Plan is to protect Minnesota's water resources from pollutants generated from a project's ultimate development's impervious surfaces, change in land use, or changed ground cover.

B. ASSIGNING RESPONSIBILITY

When developing bidding documents or other contacts, the **owner** must identify who will maintain the water quality management **BMPs** until construction is complete, all maintenance activities required in Part I.E. are complete, the site has undergone **final stabilization**, and a **Notice of Termination** has been submitted to the **Agency**.

C. PLAN CONTENTS

The Permanent Erosion and Sediment Control Plan must be prepared for the proposed project, and may be developed as a separate document from the **final plans and specifications**. The plan must contain appropriate BMPs which satisfy the above goal, and contain **standard plates** and/or specifications of these BMPs. These **standard plates** and specifications must be incorporated into the project's **final plans and specifications**. At a minimum, the plan must contain:

- 1. Land feature changes (in acres) for both **before** and **after** construction:
 - a. Total project area;
 - b. Total impervious surface area of project;
 - c. Total pervious area of project;
 - d. Total estimated impervious surface area of ultimate development;
 - e. Total estimated pervious area of ultimate development;
- Standard plates and/or specifications of permanent erosion and sediment control BMPs below (Appendix B. C. 2a. 2b. and 2c.):

a. Sediment Control

Where a project's ultimate development replaces surface vegetation with one or more acres of cumulative impervious surface and all runoff has not been accounted for in a local unit of government's existing storm water management plan or practice, the runoff shall be discharged to a wet sedimentation basin* prior to entering waters of the state.

Proposed Development

Except as provided in 2) below ("Reconstruction or Work on Existing Roadways"), the wet sedimentation basin shall be based on the project's ultimate development and comply with the following requirements:

- a) The basin's hydraulic volume shall be sufficient to capture a 1/2 inch of runoff from the impervious watershed area.
- b) Basins shall also provide a minimum of 250 ft. dead sediment storage volume below the basin's hydraulic volume/impervious acre drained.
- c) Basin inlets shall be placed above the sediment storage volume.
- d) Basin outlets shall be designed to remove all suspended solids greater than five microns with a settling velocity of 1.3×10^{-4} ft/sec.
- e) Basin outlets shall also be designed to prevent short circuiting and the discharge of floating debris.
- f) Basins must provide spillways to accommodate storm events in excess of the basin's hydraulic design.

2) Reconstruction or Work on Existing Roadways

- * While recommended, the above provision (Appendix B.C.2a.) will not be required for work on existing roadways where:
 - the drainage area is served by an existing storm sewer which is daylighted off the road's right-of-way or,
 - 2) proximity to bedrock or vertical relief precludes it, or,
 - 3) existing right-of-way precludes it.

For these situations, however, the **owner** will be required to incorporate other sedimentation or treatment devices (i.e., grass swales, smaller sediment basins, etc.).

b. Permanent Erosion Control

- 1) All drainage ditches constructed to drain water from the site after construction is complete must be **stabilized**.
- 2) All pipe outlets must be provided with permanent energy dissipation where the pipe's outlet velocity will exceed the permanent cover's erosive velocity.

c. Treatment

Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B

The **owner** is required to provide treatment of storm water through the use of **BMPs** such as grass swales, wetlands constructed for the purpose of treating **storm water**, and the planting or development of emergent vegetation around the perimeter of the wet sedimentation basin's **sediment** storage volume.

D. FINAL PLANS AND SPECIFICATIONS

The above standard plates and/or specifications are to be incorporated into the project's final plans and specifications. In addition, the final plans and specifications shall clearly denote:

- 1. Location and type of all permanent erosion and sediment control BMPs (Appendix B.C.2a., 2b. and 2c.).
- 2. The plan sheets must clearly identify all waters of the state, including wetlands identified on the National Wetlands Inventory Map within and one-half mile from the construction area which will receive direct storm water runoff from the construction site after construction is complete.

Where the waters of the state which will receive the $\frac{\text{direct}}{\text{be}}$ runoff and will not fit on the plan sheet, the resource shall $\frac{\text{direct}}{\text{be}}$ identified with an arrow, indicating both direction and distance.

3. Methods to be used for final stabilization of all exposed soil areas. For linear utility and roadway projects, final stabilization is not required on agricultural land which will be tilled within one year of project completion.

E. PLAN RETENTION

Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B Appendix B

The owner shall keep a copy of the Permanent Erosion and Sediment Control Plan and all changes to it for three years after completion of the construction project.

F. CHANGES TO THE PERMANENT EROSION AND SEDIMENT CONTROL PLAN

Changes in the plan made during construction to accommodate changed site conditions are allowable provided all of Appendix B. is complied with.

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Permit No: MN R100000

APPENDIX C

PROVISIONS

A. APPLICABILITY CRITERIA

- 1. This permit covers storm water discharges associated with a construction activity which disturb five (5) or more acres of land in all areas of the state of Minnesota, except for agricultural/silvicultural activities.
- 2. This is a National Pollutant Discharge Elimination System/State Disposal System general permit.
- 3. If the Commissioner determines that storm water discharges associated with a construction activity, or other activities, are contributing to a violation of a water quality standard or would be more appropriately regulated by an individual permit, the Commissioner may require a Permittee to be covered by an individual storm water discharge permit. The Commissioner may require a Permittee to develop and implement specific best management practices. Upon issuance of an individual permit, this general permit would no longer apply.
- 4. A permit applicant, or Permittee, may request an individual permit.

B. MPCA ADDRESS

Submit all forms, correspondence, reports, etc. to the following address:

Minnesota Pollution Control Agency Water Quality Division Attn: Construction Activity Storm Water Program 520 Lafayette Road North St. Paul, Minnesota 55155-4194

C. RESPONSE

The Permittee shall respond to Agency requests for submittal of temporary and permanent erosion and sediment control plans and water quality management plans, certificates, reports, records, or other information required by this permit. Upon request, the Permittee shall also provide a copy of this information to the local permitting authority and municipal storm sewer operator.

D. AUTHORIZED DISCHARGES

All discharges of storm water associated with a construction activity shall be composed entirely of storm water.

E. PROHIBITIONS

Discharges of any material other than storm water, such as vehicle and equipment maintenance spills; wash water; oil and other hazardous substances are prohibited by this permit.

F. DEFINITIONS

- 1. "Act" means the Clean Water Act (formerly the Federal Water Pollution Control Act), United States Code, Title 33, Sections 1251 et seq., as amended.
- 2. "Agency" means the Minnesota Pollution Control Agency (MPCA).
- 3. "Application" means a completed application for activities regulated by this permit. Application forms are available from the Agency.
- 4. "Best Management Practices (BMPs)" means erosion and sediment control and water quality management practices that are the most effective and practicable means of controlling, preventing, and minimizing degradation of surface water, including construction-phasing, minimizing the length of time soil areas are exposed, prohibitions, and other management practices published by state or designated areawide planning agencies.

Examples of BMPs can be found in <u>Protecting Water Quality in Urban Areas</u>, Minnesota Pollution Control Agency 1989, and <u>Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Frotection Agency 1992 as a reference for BMPs, and <u>Erosion Control Design Manual</u>, Minnesota Department of Transportation, et al, 1993.</u>

- 5. "Construction Activity" means a disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography which may result in accelerated storm water runoff, leading to soil erosion and movement of sediment into waters of the state. Examples can include clearing, grading, filling and excavating.
- 6. "Discharge" means the conveyance, channeling, runoff, or drainage, of storm water, including snow melt, from a construction site.
- 7. "Energy Dissipation" means methods employed at pipe outlets to prevent erosion. Examples include, but are not limited to; aprons, riprap, splash pads, and gabions which are designed to prevent erosion.
- 8. "Erosion" means the wearing away of soil by rainfall, surface water runoff, wind, or ice movement.
- 9. "Erosion Control" means methods employed to prevent erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.
- 10. "Exposed Soil Areas" means all areas of the construction site where the perennial vegetation (including trees, shrubs, and brush) has been removed. This includes topsoil stockpile areas, borrow areas and disposal areas within the construction site.

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- 11. "Final Plans and Specifications" means the reports, prints, drawings, written descriptions, and clear technical requirements necessary to build a project used by the owner for the purposes of entering into a construction contract.
- 12. "Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70 percent of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been employed. Examples of vegetative cover practices can be found in Supplemental Specifications to the 1988 Standard Specifications for Construction (Minnesota Department of Transportation, 1991).
- 13. "Five or more acres of total land area" means any project that disturbs at least five acres of land measured by the project's construction corridor, excluding areas staked as not to be disturbed. If the project is less than five acres, but is part of larger common plan of development or sale (where multiple separate and distinct construction activities may be taking place at different times on different schedules but under one plan), it is defined as "five acres or more of total land area."
- 14. "General Contractor" means the party who signs the construction contract with the owner to construct the entire project described in the final plans and specifications. Where the construction project involves more than one contractor, the general contractor will be the party responsible for managing the entire project on behalf of the owner. In some cases, the owner may be the general contractor. In these cases, the owner will sign the permit application as the general contractor and would become the sole permittee.
- 15. "Impervious Surface" means a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads.
- 16. "Local Permitting Authority" means the township, county, municipality, conservation district, watershed district, watershed management organization, or other public entity which has the authority to review and approve construction activities.
- 17. "Local Unit of Government's Existing Storm Water Management Plan or Practice" means plans or practices developed by the local permitting authority under state law for the purposes of protecting water quality.

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- 18. "National Pollutant Discharge Elimination System (NPDES)" means the program for issuing, modifying, revoking, reissuing, terminating, monitoring, and enforcing permits under the Clean Water Act (Sections 301, 318, 402, and 405) and United States Code Title 33, Sections 1317, 1328, 1342, and 1345.
- 19. "Notice of Termination" means notice to terminate coverage under this permit after construction is complete, the site has undergone stabilization, and all conditions of this permit have been satisfied. Notice of Termination forms are available from the Agency.
- 20. "Owner" means the person or party possessing the title of the land on which the construction activities will occur; or if the construction activity is for a lease holder, the party or individual identified as the lease holder; or the contracting government agency responsible for the construction activity.
- 21. "Permanent Cover" means final stabilization. Examples include grass, gravel, asphalt, and concrete.
- 22. "Paved Surface" means a constructed hard, smooth surface made of asphalt, concrete or other pavement material. Examples include, but are not limited to, roads, sidewalks, driveways and parking lots.
- 23. "Permit" means a National Pollutant Discharge Elimination System/ State Disposal System (NPDES/SDS) permit.
- 24. "Permittee" means a person, firm, or governmental agency or other institution who signs the application submitted to the Agency and is responsible for compliance with the terms and conditions of this permit.
- 25. "Runoff Coefficient" means the fraction of total precipitation that is not infiltrated into or otherwise retained by the soil, concrete, asphalt or other surface upon which it falls that will appear at the conveyance as runoff.
- 26. "Sediment" means the product of an erosion process; solid material both mineral and organic, that is in suspension, is being transported, or has been moved by water, air, or ice, and has come to rest on the earth's surface either above or below water level.
- 27. "Sediment Control" means methods employed to prevent sediment from leaving the site. Sediment control practices include silt fences, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, and temporary or permanent sedimentation basins.
- 28. "Soil" means the unconsolidated mineral and organic mineral material on the immediate surface of the earth.

- 29. "Stabilized" means the exposed ground surface has been covered by staked sod, riprap, wood fiber blanket, or other material which prevents erosion from occurring. Grass seed is not stabilization.
- 30. "Standard Plates" means general drawings having or showing similar characteristics or qualities that are representative of a construction practice or activity.
- 31. "Storm water" means the precipitation runoff, storm water runoff, snow melt runoff, and any other surface runoff and drainage (defined in 40 CFR 122.26 [b][13]). Storm water does not include construction site dewatering.
- 32. "Temporary Protection" means methods employed to prevent erosion. Examples of temporary include; straw, wood fiber blanket, wood chips, and erosion netting.
- 33. "Waters of the State" means all streams, lakes, ponds, marshes, wetlands, watercourses, waterways, drainage systems and all other bodies or accumulations of waters, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portions thereof. Waters of the state do not include storm water detention basins, or wetlands constructed for the purposes of treating storm water, which do not discharge to surface waters.

APPENDIX D

RESPONSIBILITIES

A. TRANSFER OWNERSHIP OR CONTROL

This permit may not be assigned or transferred by the permit holder. Where a new general contractor is selected after the submittal of an application, or where the general contractor changes, a new application must be, in accordance with Part I.B., submitted to the Agency at least 48 hours prior to when the general contractor begins work at the site.

B. PERMIT MODIFICATION

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

- 1. Violation of any terms of this permit;
- 2. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
- 3. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
- 4. Minn. Rules pts. 7001.0170 and 7001.0180.

C. RIGHT OF ENTRY

The Permittee shall, pursuant to Section 308 of the Act and Minnesota Statutes 115.04, allow representatives of the; Agency, local permitting authorities, local soil and water conservation districts, or municipality which operates the storm sewer system, upon presentation of credentials:

- 1. To enter upon the Permittee's premises where the construction activity is occurring for the purpose of obtaining information, examination of records, conducting surveys or investigations;
- 2. To bring such equipment upon the Permittee's premises as is necessary to conduct such surveys and investigations;
- 3. To examine and copy any books, papers, records, or memoranda pertaining to the storm water discharge.
- 4. To sample and monitor any substances or parameters at any location.

D. CIVIL AND CRIMINAL LIABILITY

Nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance with the terms and conditions provided herein.

E. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the installation of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject to under Section 311 or the Act and Minn. Stat. chs. 115 and 116, as amended.

F. LIABILITY EXEMPTION

This permit authorizes the Permittee to perform the activities described herein within the conditions set forth. In issuing this permit, the State/Agency assumes no responsibility for any damage to persons, property or the environment caused by the activities authorized or undertaken pursuant to this permit. To the extent the state/agency may have any liability for the activities of its employees, that liability is explicitly limited to that provided in the Torts Claim Act, Minn. Stat. § 3.736.

G. MINNESOTA LAWS

Nothing in this permit shall be construed to preclude the installation of any legal or administrative proceedings or relieve the Permittee from any responsibilities, liabilities, or penalties for violation of effluent and water quality limitations not included in this permit or applicable laws or regulations.

H. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

I. SEVERABILITY

The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

J. NPDES/SDS RULE

The Permittee shall comply with the provisions of Minn. Rules pts. 7001.0150, subp. 3 and 7001.1090, subp. 1.A,B,C,H,I. This permit does not require the submittal of a data monitoring report.

K. OTHER STATUTES, RULES AND ORDINANCES

The Agency's issuance of a permit does not release the Permittee from any liability, penalty or duty imposed by Minnesota or federal statutes or local ordinances, except the obligation to obtain the permit.

L. MORE STRINGENT RULES

The Agency's issuance of a permit does not prevent the future adoption by the Agency of pollution control rules, standards, or orders more stringent than those now in existence and does not prevent the enforcement of these rules, standards or orders against the Permittee.

M. AGENCY OBLIGATION

The Agency's issuance of a permit does not obligate the Agency to enforce local laws, rules or plans beyond that authorized by Minnesota Statutes.

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NORTH DAKOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM

06/2000

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SECTION 01568

NORTH DAKOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM 06/2000

PART 1 GENERAL

1.1 GENERAL

This section covers best management practices to be implemented for prevention of storm water pollution as required by the National Pollutant Discharge Elimination System (NPDES). The North Dakota Department of Health is responsible for administering permits for NPDES in the state of North Dakota. The Government has determined that the project work included under this contract requires NPDES permitting. The requirements herein supplement those covered in SECTION 01410: ENVIRONMENTAL PROTECTION.

1.1.1 Definitions

The following terms apply to this specification and the general permit, unless redefined in subsequent paragraphs.

- a. "Plan" means the Temporary Erosion and Sediment Control Plan.
- b. "EPA" means the United States Environmental Protection Agency.
- c. "Department" means the North Dakota Department of Health, Division of Water Quality.
- d. "NPDES" means the National Pollutant Discharge Elimination System.
- e. "NDPDES" means the North Dakota Pollutant Discharge Elimination System.
- f. "Owner" as referred to in the general permit shall mean the Federal Government.
- g. "Permittees" as referred to in the general permit shall mean the Federal Government and Contractor.
- h. "General Permit" means the general permit authorization to discharge storm water associated with a construction activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.
- i. "BMP" means Best Management Practices.
- j. "NDDOH" means the North Dakota Department of Health.

1.1.2 Contract Drawings

The following features are shown on or can be determined from the contract drawings:

- a. The drainage patterns and approximate slopes anticipated after the major grading activities.
- b. Areas of soil disturbance.
- c. The location(s) where stabilization practices are expected to occur.
- d. Typical details showing suggested Best Management Practices (BMP's) for erosion and sediment control.
- e. Waters of the State.

f. Final site stabilization.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA/832/R-92/005 Storm Water Management for Construction

Activities - Developing Pollution Prevention Plans and Best Management

Practices

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

NDDOT 708 Standard Specifications for Road and

Bridge Construction (1997 Edition),

Erosion Control

NDDOT 856 Standard Specifications for Road and

Bridge Construction (1997 Edition),

Erosion Control Blankets

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Temporary Erosion And Sediment Control Plan; FIO.

A specific Temporary Erosion and Sediment Control Plan shall be submitted in accordance with PARAGRAPH: PERMIT COMPLIANCE AND ADDITIONAL REQUIREMENTS.

SD-18 Records

Notice of Intent (NOI); GA.

A copy of the NOI (NDDOH Form SFN 19145) shall be submitted to the Contracting Officer at the same time it is transmitted to the state.

Notice of Termination; FIO.

A copy of the notice of termination shall be submitted to the Contracting Officer at the same time it is transmitted to the state.

1.4 PERMIT COMPLIANCE AND ADDITIONAL REQUIREMENTS

The Contractor shall comply with the requirements of Permit No. NDR03-0000.

The following define additional requirements and clarify which requirements of the Permit are to be performed by either the Contractor, the Government, or both.

1.4.1 Schedule

No contract project construction activities which requires an NPDES permit may commence until the NDPDES permit is valid.

1.4.2 Temporary erosion and sediment control plan

The contract drawings show a typical details of suggested best management practices (BMP's) for erosion and sediment control taken from EPA/832/R-92/005. The BMP's, together with applicable portions of the site drawings and specifications form an initial plan for temporary erosion and sediment control. The Contractor shall finalize and implement the plan. The finalized plan, together with documentation, shall be in accordance with the general permit NDR03-0000. The plan shall be maintained at the site and made available to federal, state, and local officials as requested. The Contractor shall determine the specific BMP's for erosion and sediment control (including the types, locations, and installation scheduling of erosion and sediment controls). These BMP's and corresponding material specifications and shop drawings shall be included in the Plan.

1.4.3 Notice of Intent (NOI)

The NOI must be signed by the Government and the Contractor. A blank copy of the form (SFN 19145) is included at the end of this section. Immediately after contract award, the Contractor shall complete the form and plan, obtain signature by the Government, and submit the form with a copy of the Plan to the state. The NOI shall be post marked at least 30 days in advance of any ground breaking activities. The Contractor is responsible for payment of the application fee.

1.4.4 Permanent erosion and sediment control plan

The Government has developed the Permanent Erosion and Sediment Control Plan and will maintain availability of the plan to federal, state, and local officials as required in the General Permit.

1.5 MEASUREMENT AND PAYMENT

The Contractor shall be responsible for the work of this section, without any direct compensation being made other than the payment received for contract items.

PART 2 PRODUCTS

2.1 SILT FENCE

Silt fence shall be manufactured and installed as shown on drawings. On level sites with minimal potential for sediment loading, the wire fabric may be omitted.

2.2 STRAW BALES

Straw shall be baled from oats, wheat, rye, barley, rice, or other coarse fiber vegetation that will percolate water. Hay baled from grass, alfalfa and clover is not acceptable.

2.3 OTHER PRODUCTS

Any products proposed for use that are not included on drawing Z2-22 shall be described fully, with catalog cuts and manufacturer's instructions for use, in the temporary erosion and sediment control plan. Other products, if proposed in the final plan, shall meet the following requirements:

Erosion control blankets shall meet NDDOT 856

PART 3 EXECUTION

As between the Government and the Contractor, the Contractor shall be responsible for fulfilling the obligations of the general permit for the following sections:

Part II-C: Stormwater Pollution Prevention Plan
Part III: Effluent Limitations, Monitoring, and Recording
Requirements

3.1 IMPLEMENTATION

The Contractor shall install the sediment and erosion control system in accordance with the plan submitted to the Contracting Officer. The BMP's shall be modified if inspection indicates distress to the system or reveals unforeseen circumstances, or if directed by the Contracting Officer. Any updates to the plan shall be recorded. Permanent stabilization shall be initiated as soon as practicable in any portion of the site where construction activities are complete.

3.2 MAINTENANCE

The Contractor shall be responsible for implementing and managing the erosion and sediment control BMP's before and during the construction activities; and ensure that the Plan will be implemented and stay in effect until the work has been completed, the entire work site has undergone final stabilization, and a Notice of Termination has been submitted to the Contracting Officer and the state permitting authority.

3.3 RECORDS

The Contractor shall record on CQC reports: (1) dates when major stripping and grading activities occur, (2) dates when construction activities temporarily or permanently cease on a portion of the site,(3) when permanent stabilization practices are initiated, and (4) activities associated with inspection and maintenance.

3.4 ATTACHMENTS

NDPDES General Permit NDR03-0000 with Notice of Intent (NDDOH Form SFN 19145) and Appendices 17 Pages

-- End of Section --

Name o	of Construc	tion Project							
Name of Company, Individual, or Organization Seeking Authorization to Discharge								Telephone No.	
Mailing Address					City	· · ·		State	Zip Code
Status of the Construction Site				3		☐ Federal ☐ Other (Specify):	<u> </u>	, <u>-</u> , -	
NATURE OF DIS	CHARGE		<u></u> .			<u>.</u>			· · · · · · · · · · · · · · · · · · ·
Brief Description			-						
Project Start Date Estimated Completion Date						Estimated Area of Total Disturbance in Acres			
Street						City			
Facility Location	OR	OR 1/4 1/4				Township Range Co		County	
	OR	Latitude o	1		=	Longitude o	ı	11	County
Receiving Waters	☐ Natural Surface Drainage			Name or	Name or Description of Receiving Waters				
	OR	☐ Municiç		Name of City					
		Storm S	Sewer	Ultimate Receiving Waters					
RETURN COMPLI	artment of H		I certify I am if To the best of accurate.	familiar with f my knowie	NOCC I	61-28-08, and with the belief, the information	e informa n in this	ation contained application is t	in this application. rue, complete, and
Division of Water Quality 1200 Missouri Ave., Rm. 203 PO Box 5520 Bismarck, ND 58506-5520 Telephone: 701-328-5210			Printed Name of Applicant(s)			Title		ie	
			Signature of Applicant(s)			Application Date			
			(Attach additi	onal nages i	if neede	d).			·

NOTICE OF TERMINATION TO CANCEL COVERAGE UNDER (NDPDES) GENERAL PERMIT FOR STORMWATER DISCHARGES

NORTH DÁKOTA DEPARTMENT OF HEALTH DIVISION OF WATER QUALITY

SFN 19146 (09/99)

FOR DEPT. USE ONLY

Permit No.: NDR03-0000

Effective Date: October 1, 1999

Expiration Date: September 30, 2004

AUTHORIZATION TO DISCHARGE UNDER THE NORTH DAKOTA POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with Chapter 33-16-01 of the North Dakota Department of Health rules as promulgated under Chapter 61-28 (North Dakota Water Pollution Control Act) of the North Dakota Century Code,

Code,	Control Acty of the North Dakota Cel						
acilities both qualifying for and satisfying the requirements	identified in Part I of this permit						
are authorized to discharge stormwater associated with C	ONSTRUCTION ACTIVITY						
o waters of the state							
n accordance with effluent limitations, monitoring requiren n Parts I-VI, hereof.	nents, and other conditions set forth						
This permit and the authorization to discharge shall expire at midnight,							
September 30, 2004.							
	Dennis R. Fewless, Director Division of Water Quality						

Date

PART I - PERMIT COVERAGE

A. Permit Area

This permit applies to all areas within the jurisdiction of the state of North Dakota.

B. **Eligibility and Limitations**

1. <u>Stormwater Discharges Covered by this Permit</u>

This permit applies to all new and existing discharges of stormwater associated with construction activity from any of the following:

- a. Construction activity including: clearing, grading, and excavation activities.
- b. Examples of eligible construction projects include but are not limited to: road building/rebuilding, site development, housing subdivision development, utility trenching, ect.
- c. Areas that are dedicated to producing earthen materials (such as soils, sand and gravel) for use at a construction site(s) as approved by the Department.

2. <u>Stormwater Discharges Not Covered by this Permit</u>

The following are not provided coverage under this permit:

- a. Stormwater discharges associated with industrial activity from any source other than construction activities of those approved operations as in Part I.B.1.b..
- b. Stormwater discharges associated with mining activities.
- c. Stormwater discharges associated with industrial activity form discharge points subject to existing effluent limitations guidelines.
- d. Stormwater discharges that the Department has shown to be contributing to a violation of a water quality standard.

C. Notice of Intent to Obtain Coverage

1. <u>Deadlines</u>

The operator of the construction activity shall submit a Notice of Intent (NOI) (form attached as Appendix A) to obtain coverage for stormwater discharges and a SWPP plan (see Part II.C.3) for the construction project, 30 days prior to the start of construction. An operator is the company, individual, or organization who has day to day supervision and control of activities occurring at the construction site. This can be the owner, developer, the general contractor or, in some circumstances, the agent of one of these parties.

2. Contents of the NOI

The Notice of Intent (NOI) shall contain, at a minimum, the following information:

- a. Name of the construction site.
- b. The status of the construction site (federal, state, private, or other entity).
- c. Name of the company, individual, or organization seeking authorization.
- d. County and location of the construction site, including latitude and longitude or Township, Range, section, and 1/4 section.
- e. A brief description of the construction activity.
- f. The anticipated starting date and the anticipated date of completion for the project.
- g. The estimated area of total disturbance in acres.
- h. Name of receiving water(s) or the name of the receiving municipal storm sewer system and receiving water(s).
- i. The signature of the applicant(s), signed in accordance with Part IV.E of this permit.

3. Submission

Completed NOIs and SWPP plans shall be submitted, by mail or hand delivery, to:

North Dakota Department of Health Division of Water Quality 1200 Missouri Avenue PO Box 5520 Bismarck, ND 58506-5520

D. Permit Certification

1. <u>Automatic Coverage</u>

If the applicant does not receive a request for additional information or a notification of denial from the Department within 10 days of receipt of the application by the Department, authorization to discharge in accordance with the conditions of this permit shall be deemed granted.

2. Request for Additional Information

The Department shall have the right to request additional data and/or deny the authorization for any particular discharge.

3. <u>Individual or Alternative General Permits</u>

- a. The Department may, at any time and by written notification only, require any person authorized by this permit to apply for and obtain either an individual NDPDES permit or to seek coverage under an alternative NDPDES general permit.
- Any person covered by this general permit may request to be excluded from such coverage by either applying for an individual NDPDES permit or filing a Notice of Intent to be covered under an alternative NDPDES general permit.

- c. When an individual NDPDES permit is issued to a person otherwise subject to this permit or the person is approved for coverage under an alternative NDPDES general permit, the applicability of this permit to the individual permittee is automatically terminated upon the effective date of the individual permit or the date of approval for coverage under the alternative general permit.
- d. When an individual NDPDES permit is denied to a person otherwise subject to this permit, or the person is denied for coverage under an alternative NDPDES general permit, the applicability of this permit remains in effect, unless otherwise specified by the Department.

4. <u>Local Authority</u>

This permit does not preempt or supersede the authority of local agencies to prohibit, restrict, or control discharges of stormwater to storm sewer systems or other water courses within their jurisdiction.

E. Continuation of Coverage

Facilities covered under this permit can continue coverage under the renewed permit, provided a satisfactory request is made. Any request to retain coverage under a renewal of this permit shall be made in writing to the Department at least 15 days prior to the expiration date of this permit. If requested by the Department, a new NOI shall be submitted.

F. Transfer of Ownership or Control

- 1. Coverage under this permit may be transferred to a new permittee if the existing and new permittee notifies the Department, in writing, at least 48 hours before the transfer of ownership or control; and the notice includes a written agreement between the existing and new permittee containing a specific date of transfer of permit responsibility, coverage and liability between them. If requested by the Department, a NOT shall be submitted by the existing permittee and a NOI submitted by the new permittee.
- 2. The new owner or operator must comply with all regulations in this permit and with all provisions of the existing SWPP plan until such time as the existing SWPP plan is amended or replaced by a new SWPP plan. If the personnel responsible for implementing the SWPP plan change, these changes must be amended to the SWPP plan within 30 days of transfer of ownership or control.

G. **Notice of Termination**

1. <u>Final Stabilization</u>

When a site has been finally stabilized, a Notice of Termination (see Appendix B) shall be submitted to the Department. Final stabilization is reached when all construction activities that are authorized by this permit have been completed, and uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed.

2. Content of NOT

The Notice of Termination (NOT) shall contain, at a minimum, the following information:

- a. Permit number.
- b. Name of construction site.
- c. Operator's name, mailing address and phone number.
- d. County and location of the construction site, including latitude and longitude or Township, Range, section, and 1/4 section.
- e. Certification that the site has been finally stabilized.
- f. Signature of the applicant(s), signed in accordance with Part IV.E of this permit.

PART II - SPECIAL CONDITIONS

A. Prohibition of Non-stormwater Discharges

All discharges covered by this permit shall be composed entirely of stormwater. The discharge of materials other than stormwater must be identified as a potential source of pollution in the SWPP plan (Part II.C.3). Unless otherwise determined by the Department, discharges other than stormwater must be in compliance with an appropriate NDPDES permit issued for the discharge.

B. Releases in Excess of Reportable Quantities

This permit does not relieve the permittee of the reporting requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302. Any release of a hazardous substance, including a release in a stormwater discharge, must be reported to the agencies identified in Part IV.F. The discharge of hazardous substances in stormwater discharges shall be minimized in accordance with the applicable SWPP plan for the facility. Should a reportable quantity release occur, the SWPP plan shall be revised to prevent the recurrence of such a release.

C. Stormwater Pollution Prevention Plans

1. All facilities covered by this permit shall prepare and implement a Stormwater Pollution Prevention (SWPP) plan that is subject to Department approval. Guidance forms for preparing a SWPP plan are located in Appendix C. The main objective of the plan shall be to identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges associated with construction activity; and to describe Best Management Practices (BMPs) which will be used to reduce the pollutants in the stormwater discharges associated with construction activity. The implementation of these objectives will be used to meet the terms and conditions of this permit.

2. <u>Plan Preparation and Implementation Deadlines</u>

a. The SWPP plan shall be submitted with the NOI, 30 days prior to the start of construction. Implementation of the plan shall be at the start of construction. The SWPP plan may be submitted and/or implemented at later dates only upon written request by the permittee showing just cause and subsequent written approval by the Department.

- b. SWPP plans approved and implemented under the previous version of this permit shall remain in effect under this permit. Operations covered under an existing SWPP plan shall amend the SWPP plan as described in Part II.C.2.d of this permit.
- c. If the permittee must also operate under an approved state or local sediment and erosion control plan, or any other stormwater management plan, it will be the permittee's responsibility to ensure that the SWPP plan for this permit complies with all other required plans. A SWPP plan is not a substitute for a stormwater management plan developed under other regulatory programs. It is acceptable for the plan to reflect the stormwater management measures developed under other regulatory programs and to incorporate the applicable portions of such programs by reference.
- d. The permittee shall amend the SWPP plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the water of the state, or if the SWPP plan proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associate with construction activity.

3. SWPP Plan Contents

Key elements for SWPP plans shall include, at a minimum, the following information:

a. Site Description

A site description shall contain, at a minimum, the following information:

- i) A description of the nature of the construction activity.
- ii) The proposed timetable for major activities.
- iii) Estimates of the total area of the site, and the area of the site that is expected to undergo clearing, excavation, or grading.
- iv) A description of the fill material to be used, the existing soils at the site, and the erodibility of such soils.
- v) The name of any receiving water(s) and the size, type and location of any outfall or; for discharges to a municipal separate storm sewer, the name of the municipal owner of the system, the location of the storm sewer discharge, and the name of the ultimate receiving waters.

b. Site Map

A site map that indicates, at a minimum, the following information:

- i) Construction site boundaries and area of soil disturbance.
- ii) The location of springs, streams, wetlands, and other surface waters.
- iii) The location of areas used for storage of building materials, soils, or wastes.
- iv) The locations of proposed and existing stormwater controls.
- v) Stormwater runoff drainage patterns.
- vi) Township, range, section or lines of latitude and longitude.

c. Significant Material Inventory

The location and description of any potential pollution sources, such as vehicle fueling, fertilizers, or chemicals, etc. Generally, significant materials are raw materials, finished products, and byproducts. The term also includes materials necessary for an operation which have the potential to be released with stormwater. The description should identify methods of storage, disposal, and outdoor processing involving significant materials.

d. <u>Best Management Practices (BMPs)</u>

The plan shall clearly describe the relationship between the phases of construction and the implementation and maintenance of BMPs. The description of BMPs shall include the following components:

i) Erosion and Sediment Controls

a) Nonstructural

A description of nonstructural practices designed to preserve existing vegetation where practicable and re-vegetate open areas as soon as practicable after construction activity ceases. In developing vegetative practices, the permittee shall consider: temporary and permanent seeding, mulching, sod stabilization, filter strips, grassed waterways, erosion blankets, geotextiles, preservation of mature vegetation and tree or shrub planting.

b) Structural

A description of structural practices which indicates how, to the degree practicable, the permittee will divert flows from exposed soil, store flows, or otherwise limit runoff from exposed areas of the site. In developing structural practices, the permittee shall consider the relevance of: straw bale dikes, silt fences, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, rock outlet protection, drain inlet and outlet protection, temporary drain diversion, sediment traps, temporary sediment basins, infiltration trenches or basins, and retaining walls.

ii) Other Controls

- a) A description of methods to reduce the tracking of sediment onto public or private roads.
- b) If applicable, a description of methods for handling and disposing of contaminated soils.
- c) A description of methods for recovering sediments.
- d) A description of spill prevention and response procedures for areas where potential spills can occur.

e. Post-construction Controls

A description of the post-construction control measures to be implemented until final stabilization is achieved.

f. Inspection and Maintenance

A description of procedures which will be used to inspect and maintain, in good and effective operating condition, the stormwater controls identified in the SWPP plan. Site inspections must be in accordance with Part III of this permit.

g. Signature

All SWPP plans must be signed in accordance with Part IV-E of this permit.

D. Additional Terms and Conditions

Stormwater discharges from construction sites shall not cause pollution, contamination, or degradation to waters of the state.

- 1. Visible or measurable erosion which leaves the construction site is prohibited. Visible or measurable erosion is defined as:
 - Deposits of mud, dirt, sediment, or similar material exceeding one-half cubic foot in volume in any area of 100 square feet or less on public or private streets, adjacent property, or into the storm and surface water either by deliberate actions or as a result of erosion; or
 - Evidence of concentrated flows of water over bare soils, turbid or sediment-laden flows, or evidence of on-site erosion on bare soil slopes, where runoff of water is not filtered or captured on the site using the techniques in the approved SWPP plan; or
 - c. Earth slides, mud flows, earth sloughing, or other earth movement which leaves the property.
- 2. If any measurable quantity of sediment leaves the site because of structural failure or lack of design capacity of the BMPs, the sediment shall be placed back on the site or properly disposed of, as soon as is prudent. Under no conditions shall the sediment be washed into the storm sewers or drainage ways.
- 3. Concrete wash water shall not be discharged to waters of the state or to storm sewer systems.
- 4. Bulk storage structures for petroleum products and other chemicals shall have adequate protection so as to contain all spills and prevent any spilled materials from entering waters of the state.

- 5. No chemicals are to be added to the discharge unless permission for the use of a specific chemical is granted by the Department. In granting the use of such chemicals, special conditions and monitoring may need to be addressed through an individual NDPDES permit or an alternative NDPDES general permit.
- 6. All stormwater discharges must comply with the requirements, policies, or guidelines, of municipalities and other local agencies. Any discharges of stormwater to storm drainage systems or other water courses under their jurisdiction, including applicable requirements in municipal stormwater management programs developed to comply with NDPDES permits, must comply with their local requirements.

PART III - EFFLUENT LIMITATIONS, MONITORING, AND RECORDING REQUIREMENTS

A. Effluent Limitations

The quality of stormwater discharges associated with construction activity shall reflect the best which is attainable through the proper implementation of all items in the SWPP plan for the construction site.

B. **Monitoring requirements**

The permittee shall inspect the construction site to ensure that the stormwater controls identified in the SWPP plan are effective and properly maintained. The construction site perimeter, disturbed areas, and areas used for material storage shall be inspected for evidence of, or the potential for, erosion, sediment accumulation, sediment material residue and spills. The following guidelines shall be used for monitoring the effectiveness of the SWPP plan:

- Site inspections shall be performed by or under the direction of the permittee at least once every 7 calender days and within 24 hours after any storm event of greater than 0.50 inches of rain per 24-hour period. The permittee shall have the option of maintaining a rain gauge at their site or utilizing the nearest National Weather Service precipitation gauge station. Any gauge station used shall be located within 10 miles of the stormwater discharge.
- 2. During storm events or periods of snow melt, when runoff occurs daily, all SWPP plan controls shall be inspected by or under the supervision of the permittee daily.
- Stormwater runoff discharges shall be visibly monitored at the above frequency to evaluate
 the effectiveness of the SWPP plan controls. If any measurable quantities of sediment are
 leaving the property, corrective action shall be taken as soon as is prudent to reduce the
 discharge of sediments.
- 4. There may be times when the performance of the site inspection may not be practical during an inspection period. Adverse climatic conditions, such as flooding, high winds, tornadoes, electrical storms, etc., or impracticable climatic conditions, such as drought, extended frozen conditions, etc., may prohibit inspections. Should this occur the permittee must make a record of the description of why the inspection(s) could not be performed in lieu of the actual inspection data. Any available documentation of the events which did not allow for the inspection should also be available.

C. Recording Requirements

Inspection results shall be summarized and recorded on a Site Inspection Record (SIR, see Appendix D). The SIRs shall be maintained on-site, in accordance with Part IV.D of this permit. The SIR shall contain, at a minimum, the following information:

- 1. The date and time of inspection.
- 2. The name of the person performing the inspection.
- 3. The date and duration (in hours) of the storm event.
- 4. The rainfall measurements or estimates (in inches) of the storm event.
- 5. The duration of time between this event and the end of the most recent storm event which was 0.50 inches or greater in precipitation.
- 6. All incidents of erosion, sediment accumulation, material residue, or spills shall be documented and noted on the SIR. The report shall include the location and description of the incident, estimated quantity of material or size of area affected, and a brief explanation of potential cause and remedial action taken.
- 7. Any measurable quantities of sediment released off the site, shall be recorded with a brief explanation as to the measures taken to prevent future releases as well as any measures taken to clean up the sediment that has left the site.
- 8. If no storm event occurs during an inspection period, "no discharge" shall be recorded on the SIR.

PART IV - COMPLIANCE RESPONSIBILITIES

- A. **Duty to Comply**. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Department advance notice of any planned changes at the permitted facility or of any activity which may result in permit noncompliance.
- B. **Operation and Maintenance.** The permittee shall at all times maintain in good working order, and operate as efficiently as possible, all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit and with the requirement of the SWPP plans. If necessary to achieve compliance with the conditions of this permit, this shall include the operation and maintenance of backup or auxiliary systems.
- C. Duty to Provide Information. The permittee shall furnish to the Department, upon request, copies of records required to be kept by this permit. When a permittee becomes aware that it failed to submit any relevant facts or submitted incorrect information in a permit application or any report, it shall promptly submit such facts or information.
- D. **Records Retention**. All records and information (including calibration and maintenance) required by this permit shall be kept for at least three years or longer if requested by the Department or EPA.

- E. **Signatory Requirements**. All applications, reports, or information submitted to the Department shall be signed and certified by the permittee in accordance with the following criteria:
 - 1. All permit applications shall be signed by a responsible corporate officer, a general partner, or a principal executive officer or ranking elected official, in addition to contractors and subcontractors involved in the construction activity or SWPP plan.
 - 2. All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described above and submitted to the Department; or
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.
 - 3. If an authorization under Part IV.E.2 is no longer accurate for any reason, a new authorization satisfying the above requirements must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.
 - 4. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

- F. **Immediate Notification**. The permittee shall report any noncompliance of discharge which may seriously endanger health or the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstance. The report shall be made to the EPA, Region VIII, Emergency Response Branch, at (303) 293-1788 and the State of North Dakota, Division of Emergency Management, at (701) 328-2121. In addition, a written submission to both the Department and EPA shall be provided within five days of the time that the permittee became aware of the circumstances. The submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the estimated time noncompliance is expected to continue if it has not been corrected; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
- G. **Bypassing**. Any bypass is prohibited except where unavoidable to prevent loss of life, personal injury, or severe property damage, and there were no feasible alternatives to the bypass. The permittee shall provide notification of unanticipated bypasses as may be required by Part IV.F, Immediate Notification. If, for other reasons, a bypass is considered necessary, a request to bypass shall be submitted, at least 15 days in advance if possible, to the Department. No bypass of this type shall occur until permission has been obtained from the Department.

H. Upset Conditions. An upset constitutes an affirmative defense to an action brought for noncompliance with technology-based permit effluent limitations if the requirements of the following paragraph are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence, that:

- 1. An upset occurred and the permittee can identify its cause(s);
- 2. The permitted facility was, at the time, being properly operated;
- 3. The permittee submitted notice of the upset as may be required under Part IV.F, Immediate Notification; and
- 4. The permittee complied with any remedial measures required under Part IV.I, Duty to Mitigate.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

- I. **Duty to Mitigate**. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. The permittee, at the Department's request, shall provide accelerated or additional monitoring as necessary to determine the nature and impact of any discharge.
- J. **Removed Materials**. Collected screening, grit, solids, sludge, or other pollutants removed in the course of treatment shall be buried or disposed of in such a manner to prevent any pollutant from entering waters of the state or creating a health hazard.

PART V - GENERAL REQUIREMENT

- A. **Right of Entry**. The permittee shall allow Department and EPA representatives, at reasonable times and, if requested, upon the presentation of credentials, to inspect any facilities or equipment (including monitoring and control equipment), to sample discharges, and to have access to and copy any records required to be kept by this permit. For facilities which discharge to a municipal or other separated storm sewer, this shall also pertain to authorized representatives of the municipal operator or the separate storm sewer receiving the discharge.
- B. **Availability of Reports.** Except for data determined to be confidential under 40 CFR, Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. As required by the Act, permit applications, permits, and effluent data shall not be considered confidential.

- C. Transfers. This permit is not transferable except upon the filing of a Statement of Acceptance by the new party and subsequent Department approval. The Department may require the new operator to apply for and obtain an individual NDPDES permit as stated in Part I.D. The current permit holder should inform the new controller, operator, or owner of the existence of this permit and also notify the Department of the possible change.
- D. **New Limitations or Prohibitions**. The permittee shall comply with any effluent standards or prohibitions established under Section 306(a), Section 307 (a), or Section 405 of the Act for any pollutant (toxic or conventional) present in the discharge or removed substances within the time identified in the regulations, even if the permit has not yet been modified to incorporate the requirements.
- E. **Permit Actions**. This permit may be modified, revoked and reissued, or terminated for cause. Also, if there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or coverage under an alternative general permit in accordance with Part I.D of this permit. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit conditions.
- F. **Need to Halt or Reduce.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- G. **State Laws.** Nothing in this permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation preserved under Section 510 of the Act.
- H. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation preserved under Section 311 of the Act.
- I. **Property Rights.** The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges; nor does it authorize any injury to private property or any invasion of personal rights; nor any infringement of federal, state, or local laws or regulations.
- J. **Severability**. The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

PART VI - DEFINITIONS

"the Act" means the Clean Water Act.

"BMP" or "Best Management Practices" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

"Construction" means any activity associated with construction, including but not limited to: clearing, grading, and excavation.

"Department" means the North Dakota State Department of Health and Consolidated Laboratories, Division of Water Quality.

"Grab" sample, for monitoring requirements, means a single "dip and take" sample collected at a representative point in the discharge stream.

"Non-stormwater discharges" means discharges other than stormwater. The term includes both process and non-process sources. Process waste water sources that require a separate NDPDES permit include, but are not limited to industrial processes, domestic facilities and cooling water. Non-stormwater sources that may be addressed in this permit include, but are not limited to: fire hydrant flushing and testing, potable water line flushing, infrequent building and pavement washdowns without detergents, uncontaminated foundation drains, springs, lawn watering and air conditioning condensate.

"Severe property damage" means substantial physical damage to property, damage to treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

"Significant materials" includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of CERCLA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with stormwater discharges.

"Significant spills" includes, but is not limited to: releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (see 40 CFR 110.10 and CFR 117.21) or Section 102 of CERCLA (see 40 CFR 302.4).

"Stormwater" means stormwater runoff, snow melt runoff, and surface runoff and drainage.

"Stormwater associated with industrial activity" means the discharge from any conveyance which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NDPDES program. For the categories of industries identified in

subparagraphs (i) through (x) of this subsection, the term includes, but is not limited to, stormwater discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or byproducts used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater. For the categories of industries identified in subparagraph (xi), the term includes only stormwater discharges from all areas listed in the previous sentence (except access roads) where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, byproducts, or industrial machinery are exposed to stormwater. For the purposes of this paragraph, material handling activities include: storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, byproduct or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots, as long as the drainage from the excluded areas is not mixed with stormwater drained from the above described areas. Industrial facilities (including industrial facilities that are federally or municipally owned or operated that meet the description of the facilities listed in this paragraph [(i)-(xi)] include those facilities designated under 122.26(a)(1)(v). The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this subsection:

- (i) Facilities subject to stormwater effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR, Subchapter N (except facilities with toxic pollutant effluent standards which are exempted under category (xi) of this paragraph);
- (ii) Facilities classified as Standard Industrial Classifications 24 (except 2434), 26 (except 265 and 267), 28 (except 283), 29, 311, 32 (except 323), 33, 3441, 373;
- (iii) Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry), including active or inactive mining operations [except for areas of coal mining operations meeting the definition of a reclamation area under 40 CFR 434.11(1)], and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge stormwater contaminated by contact with, or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts, or waste products located on the site of such operations; inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator;
- (iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of RCRA;
- (v) Landfills, land application sites, and open dumps that have received any industrial wastes (waste that is received from any of the facilities described under this subsection), including those that are subject to regulation under Subtitle D of RCRA;
- (vi) Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093:
- (vii) Steam electric power generating facilities, including coal handling sites;

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- (viii) Transportation facilities classified as Standard Industrial Classifications 40, 41, 42, 44, and 45, which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under paragraphs (i) (vii) or (ix) (xi) of this subsection are associated with industrial activity;
- (ix) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including lands dedicated to the disposal of sewage sludge that are located within the confines of the facility, with design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR 403. Not included are farm lands, domestic gardens, or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with 40 CFR 503;
- (x) Construction activity including clearing, grading, and excavation activities except: operations that result in the disturbance of less than five acres of total land area which are not part of a larger common plan of development or sale;
- (xi) Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 31 (except 311), 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25 [and which are not otherwise included within categories (i) (x)].

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

"Waters of the state" Any and all surface waters that are contained in or flow in or through the state of North Dakota as defined in NDCC 61-28-02. This definition includes all water courses, even if they are usually dry.

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06/02

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SECTION 02220

DEMOLITION 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENGINEERING MANUALS (EM)

EM 385-1-1

(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 RELATED WORK OF OTHER SECTIONS

- A. Demolition of overhead electrical transmission system: SECTION 16202: OVERHEAD ELECTRICAL TRANSMISSION SYSTEM REMOVAL.
- B. Electrical substation demolition: SECTION 16203: ELECTRICAL SUBSTATION REMOVAL.
- C. Ductile iron pipe and PVC pipe and appurtenant items for replacement of the overflow pipeline at the water storage reservoir: SECTION 02510: WATER DISTRIBUTION SYSTEM.
- D. Cast-in-place concrete for pipe plug: SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE.
- E. Water reservoir overflow pipe headwall: SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE; SECTION 03200: CONCRETE REINFORCEMENT; SECTION 03150: EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS; SECTION 03100: STRUCTURAL CONCRETE FORMWORK; SECTION 02315: EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES.

1.3 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from project site daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of

as specified.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Work Plan; GA.

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1.

Plan of Operations for Utility Abandonment; GA

The procedures and materials proposed for the accomplishment of the work. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1. Product data sheets on materials proposed including pipe caps and fastening materials shall be included in the plan of operations.

CDF mixdesign; GA

CDF mix design shall be submitted as described in PARAGRAPH: CONTROLLED DENSITY FILL (CDF).

1.5 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

1.6 PROTECTION

1.6.1 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient

bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.6.2 Protection of Structures

Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, shall remain standing without additional bracing, shoring, of lateral support until demolished, unless directed otherwise by the Contracting Officer. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.6.3 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place or be reused; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.6.4 Protection From the Weather

Salvageable materials and equipment shall be protected from the weather at all times.

1.6.5 Protection of Trees

Trees within the project site which might be damaged during demolition, and which are indicated by the Contracting Officer to be left in place, shall be protected by a 4 foot high fence as specified in SECTION 01000: GENERAL. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

1.6.6 Environmental Protection

The work shall comply with the requirements of SECTION 01410: ENVIRONMENTAL PROTECTION.

1.7 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.8 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS

2.1 CONTROLLED DENSITY FILL (CDF)

Design CDF to provide a slump of 10 inches plus or minus 2 inches, provide density in place of 90 to 125 pounds per cubic foot, and result in a minimum unconfined compressive strength of 50 psi at 28 days. The CDF mix shall contain Portland cement, fly ash, fine aggregate, and water proportioned to meet the mix requirements. Submit CDF mix proportion and teting necessary to demonstrate the proposed mix meets the mix requirements specified above.

2.2 PIPE PLUG

Concrete shall be as specified for structural concrete in SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE.

2.3 WATER RESERVOIR OVERFLOW PIPELINE

2.3.1 Pipeline

Materials and installation of ductile iron pipe and PVC pipe and appurtenant items for replacement of the overflow pipeline at the water storage reservoir: SECTION 02510: WATER DISTRIBUTION SYSTEM.

2.3.2 Concrete Headwall

Materials and installation of concrete headwall shall be in accordance with SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE; SECTION 03200: CONCRETE REINFORCEMENT; SECTION 03150: EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS; SECTION 03100: STRUCTURAL CONCRETE FORMWORK; SECTION 02315: EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES.

PART 3 EXECUTION

3.1 EXISTING STRUCTURES

Existing structures indicated on plans to be removed shall be removed. The location and approximate plan dimension of the principal items to be removed are listed in Table "A" attached at the end of this Section. In general, minor structures are not shown and the Contractor is expected to examine the work site, prior to bidding to determine the character and extent of such structures. All above ground structures, not listed separately at the end of this section and required to be removed to construct the permanent features shall be removed as part of the work to which the removal pertains. Removal of structures, not shown or specified for removal, for the convenience of the Contractor will be subject to approval.

Interior walls, other than retaining walls and partitions, shall be removed to 10.0 feet below grade. Basement slabs, foundations, and miscellaneous

debris from sites where homes have previously been removed shall be removed as specified in SECTION 02300 EARTHWORK. Streets and parking lot pavement and base courses, sidewalks, curbs, gutters, driveways, and street light bases shall be removed as indicated.

3.1.1 Abandoned Water Treatment Plant

- A. The abandoned water treatment plant facility located on 2nd St. NE at approximately Station D161+50, shall be removed in its entirety, including but not limited to the treatment plant, underground clear water well, settling basins, building foundation, and equipment inside of the building. The chemical storage tanks outside of the building on the east side shall be removed.
- B..The Government has contracted for a study to investigate the presence of asbestos or other environmentally hazardous materials in the water treatment plant facility. The study has been completed and the asbestos and other environmentally hazardous materials have been removed from the site. A letter from the Contractor that performed the study and removal of hazardous materials is included in Section 00830: ATTACHMENTS. The Phase 2 Levees Contractor shall assume that the water treatment plant facility is free of asbestos or other environmentally hazardous materials when performing demolition.
- C. The treatment plant facility is shown in photographs in Attachment 1 at the end of this Section. Available drawings from construction of the water treatment facility are available for viewing at Floan-Sanders Engineering, 1600 Central Avenue NE, East Grand Forks, Minnesota. Point of contact is Mr. Greg Boppre at (218) 773-1185.

3.2 UTILITIES

When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area.

3.2.1 Utility Removal and Abandonment

Abandoned water mains, storm and sanitary sewer lines, gas lines, electrical conduits, and other utilities that go through the levee, or under the levee such that the top of the outside of the utility is within 10 feet in elevation from the toe of the levee, shall be removed in their entirety within the levee footprint, unless otherwise shown, and bulkheaded, plugged or capped outside of the levee footprint as specified below. All abandoned utilities under the levee in which the outside top of the conduit is greater than 10 feet in elevation below the levee toe shall be removed or may be bulkheaded. Known utility conduits outside of the levee footprint that are to be bulkheaded or plugged are indicated. Unless indicated to be bulkheaded, conduits outside of the levee footprint shall be plugged. Conduits outside of the levee footprint that are to be abandoned that are less than 6 inches in diameter may be capped instead of plugged or bulkheaded. Water and sewer services shall be removed to the wye or corporation, where practicable, and abandoned as described above.

A Plan of Operations for Utility Abondonment shall be submitted for approval. The water main, storm and sanitary sewer plugs shall be inspected and approved by the City of East Grand Forks Utility Department prior to backfilling. The contact at the City is Mark Kotbra, (218) 773-1313.

3.2.1.1 Bulkheads

Bulkheads shall include plugging each end of a pipeline to be abandoned with concrete, as specified in Paragraph: Plugs, and filling the pipeline with sand or controlled density fill as specified below. Pipes to be bulkheaded that are required to be filled with controlled density fill are indicated. Other pipes indicated to be bulkheaded may be filled with controlled density fill or sand.

3.2.1.2 Plugs

Plugs shall be a concrete plug, full area of the pipe for a length of 1.5 times the inside diameter of the pipe or 2 feet, whichever is greatest. Plugs on a pressure pipe that will remain in service shall be a restrained plug, of the same material as the pipe, with thrust blocking. Plugs on a non-pressurized pipe that will remain in service shall be a plug of the same material as the pipe, with thrust blocking optional.

3.2.1.3 Capping

The types of caps to be used shall be submitted and approved as part of the Plan of Operations for Utility Abandonment. Caps on plastic or PVC conduits shall be fixed to the conduit with an approved adhesive or band. Caps on copper conduits shall be sweat or flared fittings. Caps on conduits of other types of materials shall be approved by the Contracting Officer.

3.2.2 Utility Services

Utility services are not indicated on the drawings. Services have been abandoned from homes that have been removed, however the services of homes have typically not been removed. The Contractor will encounter utility services of homes that have been removed while performing the work of this contract. The Contractor shall remove services as specified in Paragraph: Utility Removal and Abandonment.

3.3 WATER RESERVOIR OVERFLOW PIPELINE

Materials and installation of pipeline and concrete headwall shall be as specified above. The Contractor shall coordinate with the City of East Grand Forks Water Treatment Plant Superintendent regarding removal and replacement of the overflow pipeline prior to beginning removal of the existing pipeline. The water inside of the reservoir cannot be emptied completely, but can be lowered to a depth of 6 feet, if necessary, to facilitate removal and replacement of the overflow pipeline.

3.4 FILLING

Holes, open basements and other hazardous openings shall be filled in accordance with SECTION 02300: EARTHWORK.

3.5 DISPOSITION OF MATERIAL

Title to material and equipment to be demolished, except salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or damage to such property after notice to proceed.

3.5.1 Salvageable Items and Material

Contractor shall salvage items and material to the maximum extent possible. Hydrants, light posts and lights, and park shelters to be removed shall be salvaged and remain the property of the City of East Grand Forks. Salvaged hydrants and light posts shall be delivered to the City of East Grand Forks Water and Light Department at a site to be determined within the City of East Grand Forks. Removed park shelters shall be disassembled, salvaged, and stockpiled on site out of the way of construction operations, for reinstallation by others in the future.

3.5.1.1 Material Salvaged for the Contractor

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from the project site before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

3.5.1.2 Items Salvaged for Reuse

Salvaged items to be reused shall be removed and delivered or stockpiled in a manner to prevent damage and protect from damage while in storage. The Contractor will not be responsible for salvaged items after delivery or stockpiling.

3.5.2 Unsalvageable Material

Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed off-site at a site selected by the Contractor.

3.6 CLEAN UP

Debris and rubbish shall be removed from basement and similar excavations. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

3.7 PAVEMENTS

Existing pavements designated for removal shall be saw cut and removed in accordance with the details shown on the drawings. Removal of pavement under the proposed levee shall include removal of aggregate base and granular fill.

3.8 ATTACHMENT 1

Attachment 1 is included at the end of this Section.

-- End of Section --

TABLE A SCHEDULE OF STRUCTURES TO BE REMOVED PAVEMENTS, CURB AND GUTTER, MISCELLANEOUS ITEMS REACH 1

Approx. Location	Offset	Qty.	Unit	
Station(s)		Structure		
BITUMINOUS PAVEMENT				
		bituminous street surface and base course (no		
Hill Street, 1ST Ave NW	N/A	curb and gutter)	17705	SF
		bituminous (old/crumbled) and gravel street		
2ND Street NW	N/A	surface and base course (no curb and gutter)	8985	SF
Central Ave, 2nd Street NE, 1s		bituminous street surface and base course (w/		
Ave NE	N/A	concrete curb and gutter)	46773	SF
		street surface and base course for		
D131+00	650' S	roadway/driveway (assumed bituminous)	1660	SF
Business Hwy 2 Road Raise		street surface and base course (assume		
D245+60	N/A	bituminous)	32400	SF
		street surface for installation of storm culvert		
E0+00	40' W	(assume bituminous)	355	SF
E54+00	40'N	bituminous surface for storm culvert	1425	SF
CURB AND GUTTER		<u>, </u>		_
Central Ave, 2nd Street NE, 1s	st			
Ave NE	N/A	concrete curb and gutter	2480	LF
2nd Ave NE	N/A	concrete curb and gutter	300	LF
2nd Street NE	N/A	concrete curb and gutter	3167	LF
CONCRETE PAVEMENT				
		concrete street surface and base course (no		
3rd Street NW	N/A	curb and gutter)	745	SF
D140+00	100' S	concrete basketball court and concrete slab	2735	SF
		concrete sidewalks near Central Ave, 1st Ave		
D145+00	N/A	NE, 2nd Street NE	4725	SF
2nd Ave NE	N/A	concrete street surface and base course	6610	SF
2nd Ave NE sidewalk	N/A	concrete sidewalk	920	SF
2nd Street NE	N/A	concrete street surface and base course	57912	SF
MISCELLANEOUS ITEMS				1
D143+00	5' N	2FT high retaining wall	230	LF
D162+00	350' S	pump house structure	1	each
D169+00	N/A	Remove chainlink fence	270	LF
D173+00 to D177+25	Varies	Remove chainlink fence	455	LF

TABLE A SCHEDULE OF STRUCTURES TO BE REMOVED PAVEMENTS, CURB AND GUTTER, MISCELLANEOUS ITEMS REACH 1

Approx. Location					
Station(s)		Structure			
D169+00 to D177+25	Varies	Reinstall chainlink fence as shown on Dwgs.	935	LF	
D160+00	N/A	fence surrounding City compost pile	560	LF	
D163+20	45' N	New Tank Overflow Outlet Headwall	1	each	
D180+00	N/A	storm culvert	20	LF	
D179+00	120' N	CMP storm culvert with flap gate	50	LF	
D271+80	N/A	culvert	32	LF	
E27+00	10' E	culvert	42	LF	
E54+00	40' N	culvert	50	LF	

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
ELECTRIC	<u> </u>	<u> </u>	Ground							
D130+85	N/A	3 Phase	4'	E	Abandoned	Remove		Abandoned URD Electric Primary.	160	LF
D135+95	N/A	1 Phase	4'	E	City to Abandon	Remove		URD Single Phase Primary Electric line crosses Levee Alignment.	140	LF
D149+75	N/A	Secondary	2'	E	City to Abandon	Remove		Street Light Secondary Line runs along west side of 2nd Ave. NE	130	LF
D150+37	N/A	Secondary	2'	E	City to Abandon	Remove		Street Light Secondary runs along East side of 2nd Avenue NE.	130	LF
D173+30	N/A	3 Phase	4'	E	City to Abandon	Remove and install splice		Electrical Substation Underground Power line running southwest. Coordinate splice with City.	65	LF
D174+10	N/A	3 Phase	4'	E	City to Abandon	Remove and install splice		Electrical Substation Underground Power line running southeast. Coordinate splice with City.	100	LF
D190+80	N/A	3 Phs 12kv	4'	E	City to Abandon	Remove		Underground (URD) power line serves Nursery.	95	LF
GAS					Xcel to			Gas Main runs along North side of 2nd Street NE. Remove between Central		
D142+45	N/A	2"	2.5'	G	Abandon Xcel to	Remove		and 1st Ave. NE. Line served residence on	370	LF
D144+60	40' N	2"	2.5'	G	Abandon	Remove		north side of 2nd St. NE	50	LF
D145+83	N/A	2"	2.5'	G	Xcel to Abandon	Remove		Line served residence along west side of 1st Ave NE.	105	LF
D146+50	20' N	2"	2.5'	G	Xcel to Abandon	Remove		Line served residence along south side of 2nd Street NE.	50	LF
D147+55	30' N	2"	2.5'	G	Xcel to Abandon	Remove		Line served residence along south side of 2nd Street NE	60	LF
D148+00	40' N	2"	2.5'	G	Xcel to Abandon	Remove		Line served residence along south side of 2nd Street NE.	45	LF
D150+87	N/A	2"	2.5'	G	Xcel to Abandon	Remove		Line served building on East side of 2nd Ave NE.	60	LF

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
D153+72	N/A	2"	2.5'	G	Xcel to Abandon	Remove		Line served building south of 2nd Street NE.	100	LF
TELEPHON	l	<u>-</u>				Ttellio (e			100	
D170+58	N/A		1.5'-2'	Т	City to Abandon	Remove		Telephone line from water treatment plant to Electrical Substation.	350	LF
SANITARY	SEWER		1					Cricas Dark Line narallala	I	ı
D134+20	N/A	8"		SAN	Abandoned	Remove	0	Griggs Park. Line parallels levee toe and runs down 1st Avenue NW. No bulkhead required, entire pipe is to be removed to manhole.	150	LF
D134+25	40' N	N/A		SAN (man hole)	Abandoned	Remove	0	Remove San. Manhole on Hill St.	1	EACH
D134+25	N/A	8"		SAN	City to Abandon	Bulkhead	1	Line crosses levee at Hill St. Stoplog Closure. Plug open end of manhole 2S.	290	LF
D134+25	N/A	8"		SAN	City to Abandon	Remove	0	Remove line under levee footprint. Line runs to Griggs Park Restroom and crosses at Hill St Stoplog Closure.	110	LF
D134+25	NA	8"		SAN	City to Abandon	Bulkhead	1	Line crosses levee at Hill St. Stoplog Closure. Bulkhead from removed section south to where pipe bends away from road. Plug pipe end remaining in ground.	90	LF
D142+10	N/A	18"	6'	VCP, SAN	Abandoned	Remove	0	Remove San. Line on Central Ave under levee footprint (running north/south)	150	LF
D142+10	30' S	N/A		SAN (man hole)	Abandoned	Remove	0	Remove San. Manhole on Central Ave under levee footprint.	1	EACH
D142+10	N/A	18"	6'	VCP, SAN	Abandoned	Bulkhead	1	Bulkhead from removed section south to just past new trail.	150	LF
D142+10	N/A	18"	6'	VCP, SAN	Abandoned	Bulkhead	1	Bulkhead from end of removed section north to SAN manhole. Plug south side only of SAN manhole.	80	LF

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
2nd Street NE between Central and 1st Ave NE	N/A	10"	9'	SAN	Abandoned	Remove	1	Remove between Central and 1st Ave NE under levee footprint. Plug SAN manhole at 1st Ave NE and 2nd St. NE on west side only.	360	LF
DIALIS	50'N			DVC CAN	City to Abandon	Remove	2	Line served Residence on North side of 2nd Street NE and conflicts with new storm sewer. Remove line to just north of rerouted Central Ave. Plug end of line at removal and at connection w/ main line in	65	LE
D144+15	50' N	6"		PVC, SAN	Abandon	Remove	2	alley.	65	LF
D166+00	240'N	12"	8'	ACP, SAN Forcemain	Active	Remove & Replace	N/A	Remove & replace in kind within SS excavation. Coordinate w/ city EGF.	30	LF
STORM SEV	WER		1					Remove SS Manhole on		
D142+17	40' S			SS (man hole)	Abandoned	Remove	0	Central Ave under levee footprint.	1	EACH
D142+17	N/A	24"	4'	RCP, SS	City to Abandon	Remove	0	Remove SS line running north/south along Central Ave under levee footprint.	140	LF
D141+94	N/A	24"	4'	RCP, SS	City to Abandon	Remove	0	Remove SS lines between 4 catch basins on Central Ave under levee footprint.	175	LF
D142+17	N/A	24"	4'	RCP, SS	City to Abandon	Bulkhead	0	Bulkhead from end of removed section south to SS manhole.	140	LF
D142+17	230' S	N/A	7	SS (man hole)	Active	Plug north side of manhole	1	March 2002 survey indicated no conflict w/ trail. Leave manhole in place and plug north side only.	N/A	N/A
D141+92	N/A	N/A		SS (catch basin)		Remove	0	Located at intersection of Central Ave and 2ND St. NE	4	EACH
2nd Street NE between Central and 1st Ave NE	N/A	12"	10.5'	RCP, SS	City to Abandon	Remove	0	Remove between Central and 1st Ave NE under levee footprint.	340	LF

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
D146+00	60' N	24"		RCP, SS		Remove	0	Remove SS pipe between catch basins and SS manhole at intersection of 1st Ave NE and 2nd St. NE.	180	LF
D146+00	60' N	N/A		SS (man hole)		Remove	0	Remove storm manhole at intersection of 1st Ave NE and 2nd St. NE.	1	EACH
D146+00	110' N	N/A		SS (catch basin)		Remove	0	Remove 4 catch basins at intersection of 1st Ave NE and 2nd St. NE	4	EACH
D150+16	N/A	18"	6'	RCP, SS	City to Abandon	Remove	1	Bulkhead north side of manhole where storm pipe was removed. Connect end of existing storm pipe from north to new manhole 1WC.	80	LF
D149+80	45' S	N/A		SS (catch basin)	Active	Remove	0	To be replaced for new storm sewer system.	1	EACH
D150+00	45' S			RCP, SS	Active	Remove	0	Remove pipe between catch basin and manhole. Pipe to be replaced for new storm sewer system.	30	LF
D160+80	N/A	54"	18'	RCP, SS	City to Abandon	Bulkhead	1	Class IV, 0.40% Grade, Storm Sewer Line runs to Red Lake River. New MH 1CB to pick up drainage from this line. Bulkhead from new manhole south under levee to old manhole using controlled density fill. Remove pipe under impact	205	LF
D160+80	320' S	54"		RCP, SS	City to Abandon	Remove	1	basin area. Plug end of 54' pipe.	60	LF
D160+80	75' S	N/A		SS (man hole)	City to Abandon	Bulkhead	1	Use manhole to bulkhead pipe under levee. Bulkhead manhole and plug end of 54" pipe to the south of manhole.	1	EACH

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
D162+30	N/A	18"	17'	RCP, SS	To Be Abandoned	Bulkhead.	1	Storm Sewer line to Red Lake River. New MH 1EB to pick up drainage for this line at 2nd Street NE. Bulkhead pipe with controlled density fill from edge of excavation under road to 10 ft from levee edge (approx. 210 L.F.) Plug pipe end.	210	LF
D162+30	300' S	18"		RCP, SS	To Be Abandoned	Remove	1	Storm Sewer line to Red Lake River. Remove section of pipe under impact basin vicinity. Plug pipe end.	135	LF
				SS (catch	То Ве			Conflicts with new storm		
D174+20	460' N			basin)	Abandoned	Remove	0	sewer. Plug north side of remaining	1	EACH
D174+20	440' N	12"		RCP, SS	Active	Remove	1	catch basin.	35	LF
D179+15	70' N	12"		RCP, SS	City to Abandon	Remove	1	Remove existing Storm Sewer. Outlet encroaches on levee footprint. Plug pipe end.	20	LF
D178+00	440' N	12"		RCP, SS	City to Abandon	Bulkhead	1	Bulkhead from manhole to south edge of road. Plug pipe end.	45	LF
WATER	1 1						1			1
D161+05	20' N	12"	8'	CI, W	Abandoned	Remove	1	Remove line under levee footprint. (Water line previously disconnected & capped between N wall of old WTP and S curb of 2nd Street NE.) Plug pipe end.	40	LF
D161+05	120' N	12"	8'	CI, W	Abandoned	Remove	2	Remove water line where it conflicts w/ excavation for new storm sewer (approx. 40 L.F.) Plug open ends.	40	LF
D161+95	N/A	14"	8'	CI, W	Abandoned	Remove	1	Abandoned RAW line from old WTP to Red Lake River. Remove from building south under levee footprint.	70	LF

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
D161+95	220' S	14"	8'	CI, W	Abandoned	Remove	1	Remove pipe located under impact basin.	155	LF
DICALIF	N/A	CII.	ot.	CI W	Abandanad	D	2	Abandoned RAW line from King of Spud's pump house. Remove under levee footprint, new structure and under road/new storm sewer (ending at work limit). Plug	225	IE
D162+15	N/A	6"	8'	CI, W	Abandoned	Remove	2	pipe ends. Remove pipe located under	225	LF
D162+15	2501.5	<i>(</i> "	01	CI W	Abandoned	Remove	1	impact basin. Plug pipe end.	200	LE
D162+15 D163+00	250' S 25' S	6" 14"	8'	CI, W	Abandoned	Remove	1	Abandoned Water Line from abandoned WTP to Water Reservoir. Plug pipe end.	200 125	LF LF
						_		Abandoned Water Line from abandoned WTP to Water		
D163+00	30'S	16"	8'	CI, W	Abandoned	Remove	1	Reservoir. Plug pipe end. Remove existing, replace as	160	LF
		12" Exist		CI Exist, DI & PVC		Remove &		shown on Drawings; Coordinate with City of EGF and with levee	165 Ex, 205	
D164+54	N/A	&14"new	Varies	New, W	Active	Replace	0	construction. Abandoned Water Line from abandoned WTP to Water Reservoir. Remove and	New	<u>LF</u>
D161+50	75' S	14"	8'	CI, W	Abandoned	Remove	1	plug end. Abandoned Water Line from abandoned WTP to Water Reservoir. Remove and	60	LF LF
D161+50	80' S	16"	8'	CI, W	Abandoned To Be	Remove	1	plug end. Remove under levee footprint. Plug pipe ends. RAW Line is currently out	60	<u>LF</u>
D180+20	N/A	10"	8'	CI, W	Abandoned	Remove	2	of service.	180	LF
D175+00	460'N	12"	8'	CI, W	Active	Remove & Replace	N/A	Remove & replace in kind w/ in SS excavation. Coordinate w/ city EGF.	20	LF
D178+50	470' N	10"	Ÿ	CI, W	To Be Abandoned	Remove	2	Remove section of pipe conflicting with installation of storm sewer on 2nd St. NE. Plug pipe ends.	60	LF

Approx. Location Station(s)	Offset	Size	Approx . Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
					To Be			This section conflicts w/ new storm sewer. Pipe to be abandoned to the east of portamix. Existing fire hydrant to be moved to end of the active line near Portamix (just west of removed section). Plug pipe		
D183+00	425' N	6"	8'	ACP, W	Abandoned	Remove	0	end.	130	LF
D185+00	380' N	6"	8'	ACP, W	To Be Abandoned	Remove	1	Remove pipe section conflicting with new storm sewer. Plug pipe end.	40	LF
D188+00	280' N	N/A	N/A	Hydrant, W	Active	Salvage and Relocate	0	Salvage and Reinstall hydrant approx. 575 L.F. to the west (just west of Portamix).	1	EACH
D212+90	N/A	1.5"	7'-9'	PVC, W	Mar. Polk to Abandon	Remove	0	Marshall Polk to Abandon.	125	LF
D214+40	N/A	1.5"	7'-9'	PVC, W	Mar. Polk to Abandon	Remove	0	Marshall Polk to Abandon and relocate the section of Water Line under the Levee.	330	LF

TOTAL PLUGS 34

1 E-Existing Underground Electric

G-Existing Gas

T- Existing Telephone

ACP- Asbestos-Concrete Pipe

CI- Cast Iron

PVC- polyvinylchloride

RCP-Reinforced Concrete Pipe

SAN- Existing Sanitary Sewer

SS- Existing Storm Sewer

VCP- Vitrified Clay Pipe

W - Existing Water

² Plugs will be placed on open ends of pipes (greater than 6" diameter) or manholes left in the ground. Bulkheaded pipes will be filled with sand and "sealed off" or "plugged" at each end using a short section of concrete or brick and mortar (plugs are assumed a part of the bulkheading and are not counted separately in the "plugs" column).

TABLE A SCHEDULE OF STRUCTURES TO BE REMOVED PAVEMENTS, CURB AND GUTTER AND MISCELLANEOUS ITEMS REACH 2

Approx. Location	Offset	Item	Qty.	Unit
Station(s)		Structure		
BITUMINOUS PAVEM	IENT			
F102+00	N/A	bituminous trail	3060	SF
James Ave. SE	N/A	bituminous surface and base course	11410	SF
CURB AND GUTTER				
James Ave. SE	N/A	concrete curb and gutter	3700	LF
CONCRETE PAVEME	NT			
James Ave. SE	N/A	concrete surface and base course	63882	SF
		concrete sidewalk east side of		
F102+00	N/A	James Ave.	1750	SF
James Ave. SE	N/A	10 concrete driveways	3736	SF
MISCELLANEOUS IT	EMS			
James Ave. SE	N/A	salvage decorative street lights	9	EACH
F106+00	N/A	salvage and reinstall stop sign	1	EACH
F109+00	N/A	salvage fire hydrant	1	EACH
F118+00	N/A	salvage fire hydrant	1	EACH
James Ave. SE	N/A	salvage sanitary manhole castings. (all except manhole at 8th St.SE)	7	EACH
James Ave. SE	N/A	salvage storm manhole castings (all except manhole at 8th St.SE)	3	EACH

Approx. Location Station(s)	Offset	Size	Approx. Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
ELECTRIC								-		
F107+40	N/A	Secondary	2'	E	City to Abandon	Remove	N/A	St. Light Secondary line serves light pole on east side of James Ave.	25	LF
1107+40	IV/A	Secondary		ь	City to	Remove	11/71	URD line Crosses	23	LI
F107+45	N/A	3 Phase	4'	Е	Abandon	Remove	N/A	alignment	25	LF
F109+10	N/A	Secondary	2'	E	City to Abandon	Remove	N/A	St. Light Secondary line serves light pole on east side of James Ave.	25	LF
F111+00	N/A	3 Phase	4'	Е	City to Abandon	Remove	N/A	URD line Crosses alignment	25	LF
F112+30	N/A	Secondary	2'	E	City to Abandon	Remove	N/A	St. Light Secondary line serves light pole on east side of James Ave.	25	LF
F115+30	N/A	Secondary	2'	E	City to Abandon	Remove	N/A	Street Light Secondary line serves light pole on north side of James Ave and James CT.	25	LF
1115+30	IV/A	Secondary		Е	City to	Kemove	IV/A	URD line Crosses	23	LI
F115+35	N/A	3 Phase	4'	Е	Abandon	Remove	N/A	alignment	25	LF
F119+45	N/A	Secondary	2'	E	City to Abandon	Remove	N/A	Street Light Secondary line serves light pole on north side of James Ave.	90	LF
					City to			URD line Crosses		
F119+50	N/A	3 Phase	4'	Е	Abandon	Remove	N/A	alignment	90	LF
James Ave NE	N/A	12"		RCP,SS	To be	Remove	0	Remove pipe	340	LF
James Ave NE	IN/A	12		KCP,33	replaced w/ new storm pipe	Remove	U	between Greenwood Dr. and 6th St. SE.	340	LF

Approx. Location Station(s)	Offset	Size	Approx. Depth Below Ground	Service (1)	Status	Required Action	Plug (2)	Comments	Qty.	Unit
F109+00	N/A	12"	5'	RCP,SS	City to Abandon	Remove	1	Pipe crosses under James Ave. and Floodwall alignment. Connect old SS line to new manhole to be routed along James to the north. Plug end of SS pipe between floodwall and trail.		LF
James Ave NE and 6th St.		N/A		SS (man hole)		Remove	0		1	each

TOTAL PLUGS 1

1 E -Existing Underground Electric RCP-Reinforced Concrete Pipe SS- Existing Storm Sewer

2 Plugs will be placed on open ends of pipes (greater than 6" diameter) or manholes left in the ground. Bulkheaded pipes will be filled with sand and "sealed off" or "plugged" at each end using a short section of concrete or brick and mortar (plugs are assumed a part of the bulkheading and are not counted separately in the "plugs" column).

TABLE A SCHEDULE OF STRUCTURES TO BE REMOVED PAVEMENTS, CURB AND GUTTER AND MISCELLANEOUS ITEMS REACH 3

Approx. Location	Offset	Item	Qty.	Unit
Station(s)		Structure		
MISCELLANEOUS ITEMS				
		Salvage light pole. Coordinate with		
190+96	15' S	City of Grand Forks.	1	EACH

Notes:

1. No buried utilities have been identified in this area, however notes on drawings indicate "Abandoned utilities and services encountered under the levee footprint to be removed by contractor."

Attachment 1

Photographs

Attachment 1



Existing water treatment plant viewed from the East. Note the chemical storage tanks on the left in the photograph to be removed by the Contractor as part of this project. The piping in the foreground will be removed by others prior to the start of construction.



Existing water treatment plant viewed from the West. The building on the left of the picture was constructed at a later date than the building on the right. Note there is a buried 52 feet x 52 feet concrete clear water well in the foreground to be removed by the Contractor as part of this project.

Attachment 1



Existing water treatment plant viewed from the South. Note the chemical storage tanks in the foreground to be removed by the Contractor as part of this project. Also note, there are concrete stilling basins to be removed by the Contractor as part of this project behind the chemical storage tanks where the trees and brush are visible. The concrete stilling basins are approximately 49 feet x 33 feet and have a total capacity of 126,000 gallons.



Existing water treatment plant viewed from the Southeast. The building on the left houses the pump room, filter house, and boiler room. Concrete stilling basins are hidden from view between the two buildings behind the chemical storage tanks. The car in the foreground will be removed by others prior to the start of construction.

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SECTION 02230

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06/02

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SECTION 02230

CLEARING AND GRUBBING 06/02

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, metal debris and other debris and rubbish occurring in the areas to be cleared.

1.1.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

1.1.3 Clearing and Grubbing Limits

The Contractor shall assume that clearing and grubbing shall be performed on all trees, stumps, and other vegetation, described above, within the work limits indicated. The Contractor shall give the Contracting Officer a minimum of 72 hours of notice of commencing clearing and grubbing operations. The Contracting Officer will mark trees, brush, and other vegetation within the work limits that are to be saved and not cleared and grubbed.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require as specified in SECTION 02220: DEMOLITION, and SECTION 01000: GENERAL.

Limbs of trees designated to be left standing within the cleared areas that are damaged by construction operations shall be trimmed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in any dimension shall be painted with an approved tree-wound paint.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings and levees, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

Where indicated or directed by the Contracting Officer, trees and stumps shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 DISPOSAL OF MATERIALS

3.4.1 Materials Other Than Salable Timber

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, including existing metal debris and other debris and rubbish, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

3.5 ACCEPTANCE

Upon completion of the site clearing, obtain the Contracting Officer's acceptance of the extent of clearing and grubbing.

-- End of Section --

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SECTION 02290

GEOTECHNICAL MONITORING SYSTEMS 06/02

PART 1 GENERAL

1.1 SCOPE

This section consists of systems to monitor soil settlement and includes the following:

- a. Furnish, install, and survey settlement gages.
- b. Coordination with Contracting Officer's representative during installation of monitoring systems and embankment material.

1.2 RELATED WORK OF OTHER SECTIONS

The following items of related work are covered under other sections:

- 1) Clearing and Grubbing: SECTION 02230: CLEARING AND GRUBBING.
- 2) Placement of Embankment: SECTION 02300: EARTHWORK.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1997) Carbon Structural Steel
ASTM A 53	(1990, Revision B) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A 276	(1992) Stainless and Heat Resisting Steel Bars and Shapes
ASTM D 1785	(1992) Poly (Vinyl Chloride) PVC Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2564	(1991, Revision A) Solvent Cements for Poly (Vinyl Chloride) PVC Plastic Piping Systems

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Product Data; GA

Material catalog cuts of steel and plastic piping and related fittings, and other incidental items.

SD-08 Statements

Testing Laboratory Statment; GA

Submit name, location, and qualification of testing laboratory or firm.

Filling Plan; GA

Submit plan for filling as it relates to geotechnical monitoring systems in accoardance with SECTION 02300: EARTHWORK.

SD-09 Reports

Settlement Gage Readings; FIO

Submit settlement gage readings within 24 hours of obtaining readings. Submission shall be on a form(s) of the Contractor's choosing, but shall contain all previous readings for each settlement gage.

PART 2 PRODUCTS

- 2.1 MATERIALS
- 2.1.1 Plastic Pipe for Settlement Gage Risers

Shall be PVC, rigid, ASTM D 1785, Schedule 40. Size as shown.

2.1.2 Plastic Pipe Couplings

Shall be PVC, ASTM D 1785, Schedule 40, slip or threaded couplings for the pipe sizes indicated on the drawings.

2.1.3 Solvent Cement

Shall be in accordance with ASTM D 2564.

2.1.4 Steel Pipe for Settlement Gages

Shall meet the requirements of ASTM A 53 - B.

2.1.5 Settlement Gage Base Plate

Shall be plate steel meeting requirements of ASTM A 36.

PART 3 EXECUTION

3.1 PREPARATION

Excavate areas to receive settlement gages. Tamp excavation bottom with hand tamper to level surface to receive settlement gage.

3.2 INSTRUMENTATION INSTALLATION

3.2.1 Order Of Work

Install settlement gages prior to placing fill within 100 feet of the particular settlement gage in question. Do not install settlement gages more than 36 hours prior to placing embankment fill at the site.

3.2.2 Settlement Gage Installation

Settlement gages shall be provided as shown and maintained as required herein. Settlement gages in the levee shall be installed 5 feet riverward of the levee centerline. Each base plate shall be placed on the prepared surface of foundation material. After initial placement of the gage, install 12 inches of fill near the plate to stabilize the gage. The Contractor shall determine the elevations of the base plates and x-y coordinates of the top of the riser pipes before fill placement and continue to take elevation and x-y coordinate readings. During embankment construction, the settlement gages shall be surveyed weekly, prior to the placement of any additional fill and each time a section of riser pipe is added to a settlement gage, until completion of the embankment construction. After the embankment has been completed, the settlement areas shall be surveyed monthly until the end of the contract. The Contractor is responsible for adding riser pipe and the protective plastic casing. The elevation and x-y coordinates of the stem shall be determined immediately before and immediately after each extension is added. These elevations will be verified by the Contracting Officer. Care must be taken to install the stem plumb. The Contractor shall extend the stem in increments as the embankment rises but at no time shall the top of the stem be lower than one-foot above the surface of the embankment. The Contractor shall conduct its operations in such a manner that installed settlement gages are neither disturbed nor damaged. Suitable markers shall be placed around the gages for protection. Fill around the stem shall be compacted to the same density and moisture content as the surrounding material. Each settlement gage disturbed, damaged, or destroyed due to fault or negligence on the part of the Contractor shall be restored or replaced, as directed by the Contracting Officer, by the Contractor and at no additional cost to the Government. No additional payment will be made for compaction of fill around the settlement gages or for interference with the Contractor's operations resulting from the settlement gage measurement requirements or installations.

3.3 QUALITY CONTROL

The Contractor shall establish and maintain quality control for work under this section to assure compliance with contract requirements and maintain records of his quality control for all construction operations including, but not limited to the following:

- 1) Compaction
- 2) Settlement gage instrumentation installation
- 3) Settlement gage instrumentation survey readings

A copy of the records of inspections and tests, as well as the records of corrective action taken shall be furnished to the Government as directed by the Contracting Officer.

-- End of Section --

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⁻⁻ End of Section Table of Contents --

SECTION 02300

EARTHWORK 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Materials Finer Than 75 Micrometers (No. 200 Sieve) in Mineral Aggregates by Washing
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12.400 ft-lbf/ft3 (600 KN-m/m3)
ASTM D 1140	(1997) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488	(1993) Practice for Description and Identification of Soils (Visual-Manual

Pr	ocedur	e)
	CCCGGI	\sim

ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	(1994) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4718	(1987; R 1994) Correction of Unit Weight and Water Content for Soils Containing Oversize Particles

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-09 Reports

Testing; FIO.

A summary of testing results indicated in PARAGRAPH: TESTING shall be submitted when the site work is substantially complete. The Contracting Officer shall be informed of test results daily for direction on corrective action required. Draft copies of field testing results shall be furnished to the Contracting Officer on a frequent and regular basis as directed, but do not need to be formally transmitted through the submittal process.

Daily Report Forms; FIO.

A compilation of the daily report forms for earthwork observation and inspection trench observations ordered by date shall be submitted when the work is substantially complete. Preliminary copies shall be furnished to the Contracting Officer on a weekly or monthly basis as directed, but do not need to be formally transmitted through the submittal process.

1.3 SUBSURFACE DATA

Reference the Physical Data clause in SECTION 00800:

1.4 ALTERNATE BORROW SOURCES AND EVALUATION

Borrow materials shall be produced from the sources listed in SECTION 00830: ATTACHMENTS. If the Contractor proposes to furnish materials from a source not listed, the Government will make such investigations and

evaluations as necessary to determine whether or not materials with acceptable characteristics can be obtained from the proposed source.

1.5 ALTERNATE SOURCES

1.5.1 Evaluation by Site Inspection

If the Contractor proposes to furnish borrow from an unlisted source, the Government will evaluate the alternate source and reply within 30 days. An investigation shall be performed by a Government geologist or engineer. The Contractor shall expose fresh soil for the full height of the face proposed for production during the field evaluation.

1.5.2 Evaluation by Test Data

If sufficient information is not available, the Government will reconsider the alternative source if evaluation is supplemented by sampling and testing of the properties specified for the material. If the Contractor wishes to pursue the alternate source, the Government will notify the Contractor of required sampling and number of tests required. The Contractor shall be responsible for sampling and testing costs for alternate sources. The Contracting Officer shall be present during the sampling, unless waived. Information provided with the samples shall include the location and elevation from which the sample was taken. Testing shall be completed by a laboratory approved in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL. Test results and jar samples shall be furnished to the Government geologist at the District Office. This will require a 14-day evaluation period after the test results are received at the District Office.

PART 2 PRODUCTS

2.1 DEFINITIONS

2.1.1 Satisfactory Materials

Satisfactory materials shall be of a character and quality satisfactory for the purpose intended, and meet the applicable material specifications.

2.1.2 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified a GM and SM will be identified as cohesionless only when the fines are nonplastic.

2.1.3 Proctor

Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698. The maximum density is hereafter abbreviated as the "Standard Proctor" or "Proctor" value. The optimum moisture content, $w_{\rm O}$, is the water content at which the soil is compacted to the maximum density as determined during the test procedure presented in ASTM D 698.

2.2 MATERIALS

All material placed as fill or backfill shall consist of material classified by ASTM D 2487 as GW, GP, GC, GM, SP, SM, SC, CL, and SW. The material shall be free of ice, snow, frozen earth, trash, debris, sod, roots, organic matter, or stones larger than 3 inches in any dimension.

2.2.1 Common Borrow

Common borrow shall have less than 40% retained on the No. 4 sieve, and less than 30% retained on the 3/4" sieve.

2.2.2 Select Granular Fill

Select granular fill shall meet requirements for common borrow and shall contain not more than 5% by weight of material passing the No. 200 sieve. The maximum allowable aggregate size shall be 1-1/2 inches.

2.2.3 Granular Fill

Granular fill shall meet requirements for common borrow and shall contain not more than 12% by weight of material passing the No. 200 sieve.

2.2.4 Impervious Fill

Impervious fill shall meet requirements for common borrow and shall have a plasticity index less than 50 and classified by ASTM D 2487 as CL or CH.

2.2.5 Select Impervious Fill

Select impervious fill shall meet requirements for common borrow, shall have a plasticity index less than 30, a clay fraction less than 40% by weight finer than 0.002 mm and classified by ASTM D 2487 as CL or CH.

2.2.6 Random Fill

Random fill shall consist of native materials meeting the requirements for common borrow.

2.3 CONSTRUCTION EQUIPMENT

Compaction equipment shall consist of sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil type being compacted. Water flooding or jetting methods of compaction will not be permitted for any soil types. Sprinkling equipment for cohesive soils shall apply water uniformly, in controlled quantities and be capable of variable application widths.

2.3.1 Dams and Levees

Use of sheepsfoot rollers (vibratory or non-vibratory), or scarification

between lifts, is required for construction of dams, dikes, or levees (any water retaining structures). Construction equipment and methods shall avoid poor bonding between lifts, characterized by layered or laminated texture at the lift interfaces. Smooth surfaces (such as produced from smooth drum rollers, rubber-tired rollers, and construction traffic) shall be scarified prior to placing subsequent lifts.

PART 3 EXECUTION

3.1 CLASSIFICATION OF SOIL MATERIALS

Classification of soil materials shall be performed by the Contractor in accordance with ASTM D 2488. The contracting Officer reserves the right to revise the Contractor classifications. In the case of disagreement, the Contracting Officer's classification will govern unless the soils are classified in accordance with ASTM D 2487. All testing completed by the Contractor in conjunction with soil material classification will be considered incidental to the contract work.

3.2 Stockpiles

Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed. Satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes contaminated, frozen or too wet for use, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. With the exception of the borrow areas, stockpiles shall not be placed riverward of the levee and shall not be placed higher than the proposed levee elevation.

3.3 STRIPPING OF TOPSOIL

Where indicated or directed, topsoil shall be stripped to a minimum depth of 6 inches unless otherwise shown or directed. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Topsoil shall be kept separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2-inches in diameter, and other materials that would interfere with planting and maintenance operations. Any surplus of topsoil from excavations and grading shall be removed from the site except at borrow sites.

3.4 EXCAVATION

After topsoil removal has been completed, excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated. Excavation material suitable for use as fill shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory material,

including any soil which is disturbed by the Contractor's operations or softened due to exposure to the elements and water, and surplus material shall be disposed of in areas approved for off-site storage. Excavation carried below the depths indicated shall be refilled to the proper grade with satisfactory material. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be excavated from the borrow areas indicated or from other approved areas selected by the Contractor as specified.

3.4.1 Changes and Differing Site Conditions

Any excavation subgrades that are unstable, pump, rut excessively, reveal soil conditions that are substantially different from that indicated in the contract, or are unsuitable for proceeding with the work shall immediately be reported to the Contracting Officer. In the event that it is necessary to remove material to a depth greater than specified, the Contracting Officer will provide direction for changed work; and an adjustment in the contract price will be considered in accordance with the contract. Unsatisfactory material encountered below the grades shown shall be removed as directed. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer. The Contracting Officer shall be notified prior to proceeding with any unauthorized work. Additional work not authorized by the Contracting Officer shall be at the Contractor's expense.

3.5 DITCHES, GUTTERS, AND CHANNEL CHANGES

Ditches, gutter, and channel changes shall be cut accurately to the cross sections and grades indicated. Gutters and ditches shall be finished in a manner that will result in effective drainage. All roots, stumps, rock, and foreign matter in the sides and bottom of ditches, gutter, and channel changes shall be trimmed and dressed or removed to conform to the slope, grade, and shape of the section indicated. Care shall be taken not to excavate ditches and gutters below the grades indicated. Excessive ditch and gutter excavation shall be backfilled to grade with properly placed and compacted material. All ditches and gutters excavated under this section shall be maintained until final acceptance of the work. Satisfactory material excavated from ditches and channel changes shall be placed in fill areas.

3.6 BORROW MATERIAL

Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be obtained from the borrow areas shown, from removal of the existing levees as shown, or from other approved sources, either private or within the limits of the project site, selected by the Contractor. Material excavated from existing levees, except for stripping materials, shall be used as impervious fill as shown, unless otherwise directed. The Hangsleben and Erickson properties shall be used to the maximum extent possible prior to utilizing the Section 26 property. Unless otherwise

provided in the contract, the Contractor shall obtain from the owners the right to procure material, pay royalties and other charges involved and bear the expense of developing the sources, including rights-of-way for hauling. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval. Necessary clearing, grubbing, and drainage of borrow pits, disposal of debris thereon, and restoration shall be considered related operations to the borrow excavation.

3.6.1 Borrow Area Cultural Resources Investigation

A cultural resources investigation is currently being performed, by the U.S. Army Corps of Engineers (USACE), on the Hangsleben and Erickson borrow areas. It is estimated by the USACE that the cultural resources investigation will be completed by July 1, 2002. The Contractor shall confirm that the investigation is complete and that the property has cultural resources clearance prior to clearing and grubbing or obtaining borrow material from these borrow areas. The Section 26 borrow area has been given cultural resources clearance.

3.6.2 Excavation and Borrow Pits

Except as otherwise permitted, borrow pits and other excavation areas shall be excavated providing adequate drainage. Remove all topsoil and stockpile for the required restoration. Overburden and other spoil material shall be transported to designated spoil areas or otherwise disposed of, or used for special purposes. Borrow pits shall be neatly trimmed and drained after the excavation is completed. The Contractor shall ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.6.2.1 Restoration of Borrow Areas

Upon completion of levee removal, removal areas shall be restored as shown or specified. Upon completion of excavation from indicated borrow areas, the bottom of the borrow areas shall be graded to provide free surface drainage and preclude ponding and erosion. Side slopes shall not be steeper than 1 vertical on 5 horizontal. Stripped topsoil shall be replaced at the Hangsleben and Erickson properties. Do not replace stripped topsoil on the Section 26 borrow area. The Hangsleben and Section 26 borrow areas are not to be seeded. The Erickson borrow area shall be seeded with winter wheat if planted in the Spring or oats if planted in the Fall at a rate of 20 pounds per acre. The Erickson borrow area shall also be seeded with Class 3 seed mix as specified in Section 02920: SEEDING, SODDING, AND TOPSOIL. Any other borrow areas, except for the Hangsleben and Section 26 areas, shall be seeded with winter wheat if planted in the Spring or oats if planted in the Fall at a rate of 20 pounds per acre, and with one of the four seed mixture Classes specified in Section 02920: SEEDING, SODDING, AND TOPSOIL as approved by the Contracting Officers Representative..

3.6.3 Utilization of Excavated Materials

Material removed from excavations shall be incorporated in the work insofar as practicable. No excavated material that is satisfactory for use as fill shall be wasted without specific written authorization. Material authorized to be wasted shall be stored in designated areas approved for surplus material storage and disposed of offsite. No excavated material shall be disposed of in such a manner as to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the complete work in any way.

3.7 EMBANKMENTS

Fills and embankments shall be constructed at the locations and to the lines and grades indicated. Fill shall meet the material specifications for the zones indicated on the drawings. The material shall be placed in successive horizontal layers for the full width of the cross section and shall be compacted as specified. Each layer shall be compacted before the overlaying lift is placed.

3.8 STRUCTURES

See SECTION 02315: EXCAVATION, FILLING AND BACKFILLING FOR STRUCTURES

3.9 LEVEES

3.9.1 Embankment

If not specifically identified, common borrow, random fill, or other unclassified material shall be sorted to the extent practicable with the more cohesive and less pervious material placed riverside, and sandy free-draining material placed landside.

3.9.2 Inspection Trench

The inspection trench will be used to locate undesirable subsurface features. Any pipes, tiles, conduits, buried debris, or other utilities that are indicated or specified for removal shall be removed from within the footprint of the levee and plugged outside of the levee limits as directed by the Contracting Officer. Unsatisfactory foundation materials encountered shall be removed from within the footprint of the levee as directed by the Contracting Officer. Utilities indicated or specified to remain in place shall be protected from damage during inspection trench operations. The Contractor shall notify the Contracting Officer 48 hours prior to start of this work. Observation shall be recorded on the daily report forms attached to this specification, or to a Contractor's special purpose form for observing trench excavations if approved by the Contracting Officer.

3.9.2.1 Inspection Trench Excavation and Observation

An inspection trench will be excavated as shown on the plans. Immediately after excavating the trench, the Contractor shall inspect and record the soil and water conditions encountered and any other pertinent features. Soils on the base and side slopes shall be identified in accordance with ASTM D 2488. In reaches where caving occurs, the Contractor shall either

widen the trench, dewater to keep the trench stable, or assign a competent person to observe the excavation continuously in addition to the excavator operator. Excessive water seepage shall be removed to allow visual inspection. During construction of the inspection trench, the Contractor shall immediately notify the Contracting Officer in the event that soil conditions encountered differ significantly from those shown on the boring logs.

3.9.2.2 Inspection Trench Backfill

The Contracting Officer will observe the trench before backfilling, unless waived for trench stability reasons. All water and mud shall be removed from the trench before backfill is placed. The excavated material may be used for backfill only if it meets the material specified. All inspection trench backfill shall be placed in lifts and completed as specified in PARAGRAPH: COMPACTION.

3.9.2.3 Inspection Trench Location

The inspection trench shall generally be located close to the levee centerline. The inspection trench shall be continuous at all points, aligned with smooth curves, and free from abrupt changes in alignment. The Contracting Officer may direct the actual alignment of the inspection trench within the limits of the levee right of way to intercept suspect areas

3.10 SUBGRADE PREPARATION

All areas upon which fill is to be placed shall be stripped before the fill is started. Material shall not be placed on surfaces that are muddy, frozen, contain frost, or where unsatisfactory material remains in or under the fill. For cohesionless soils, the subgrade surface shall be compacted to at least 100% of the Standard Proctor density. For cohesive soils, the subgrade shall be proof rolled with rubber-tired equipment and any soft areas shall be brought to the Contracting Officer's attention. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be stepped such that the fill material will bond with the existing surface.

3.10.1 Subgrade Correction

Soft or otherwise unsatisfactory material shall generally be removed and replaced with satisfactory excavated material or other approved material as directed. Low areas resulting from removal of unsatisfactory material shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified.

3.11 FINISHING

All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily

obtainable from blade-grader operations, except as otherwise specified. Ditches and gutters shall be finished to permit adequate drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for establishment of turf.

3.11.1 Pavement Subgrade Tolerances

When the final layer of base has been completed, and at the time any additional construction is to be placed thereon, the finished surface of the base shall not vary more than 0.05 feet from the plan elevation.

3.12 PLACING TOPSOIL

Topsoil placement is covered in SECTION: ESTABLISHMENT OF TURF.

3.13 COMPACTION

3.13.1 Moisture Control

Control of moisture in the fill shall be maintained to provide acceptable compaction. Dried or crusted cohesive soils shall be plowed, disked or otherwise broken up before compaction. If water is added to fills, the layer shall be spread in even lifts, moistened as necessary, thoroughly mixed, and compacted. Maintain moisture content for select impervious fill between $w_{\rm O}$ - 3% and $w_{\rm O}$ + 1% during placement and compaction.

3.13.2 Placement and Compaction

Each layer shall be spread uniformly. The type of fill, its maximum uncompacted lift thickness, and the minimum compaction requirements (Percent of Standard Proctor density) to which each type of fill shall be compacted shall be as listed below.

Fill Zone	Maximum Uncompacted Lift Thickness (inches)	Percent of Standard Proctor Density
General Grading (Random Fill)	12	90
Structure Subgrades Floor Slabs and Steps	9	100
Structure Backfill	12	95
Levees	12	95

Utility Backfill See SECTION 02316: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS. Final backfill shall comply with the requirements above.

- a. Fill materials shall be placed in horizontal layers not exceeding 6 inches loose depth when hand-operated compactors are used.
- b. Embankments and subgrade under pavements shall be compacted to at least the Percent of Standard Proctor density as follows:

- (1) For fill sections the top 36 inches below the aggregate base course shall be placed in uncompacted lifts not exceeding 9 inches and compacted to at least 100% of Standard Proctor density.
- (2) For cut sections in cohesionless soils the subgrade surface shall be compacted to at least 100% of Standard Proctor density. For cut sections in cohesive soils, the subgrade shall be proof rolled and any soft areas shall be brought to the Contracting Officer's attention.

3.14 TESTING

3.14.1 General

All testing expenses shall be the Contractor's responsibility. Prior to sampling and testing the work, testing laboratories shall be inspected and approved in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL. The Contracting Officer reserves the right to direct the location and select the material for samples to be tested and to direct where and when moisture-density tests shall be performed.

3.14.2 Field Density Tests

Report forms for summaries of field density tests shall include the minimum information. Additional data required by the applicable ASTM test methods shall be kept on file by the Contractor. Tests shall be numbered sequentially throughout the job, and retests shall reference the original test number (1A, 1B, etc.):

- 1. Test Number.
- 2. Dry density, water content and gravel content of field test.
- 3. Proctor Number, maximum dry density, optimum water content, and gravel content.
- 4. Relative Compaction.
- 5. Each test shall be plotted on the graphic presentation of the applicable Proctor test.

3.14.3 Proctor Tests

Report forms for summaries of Proctor tests shall include the minimum information. Additional data required by the applicable ASTM test methods shall be kept on file by the Contractor. Jar samples shall be retained by the testing laboratory for each Proctor test until field testing is completed.

- 1. Test Number and method.
- 2. Sample location and visual soil description.
- 3. Maximum dry density, and optimum water content.

- 4. Gravel contents in sample and test specimens.
- 3.14.4 Treatment of Oversize Particles for Density Tests

The fine gravel contents shall be corrected by selecting an appropriate Proctor sample. The fine gravel content shall be the particles retained on the No. 4 sieve and passing the 3/4" sieve. The fine gravel content of the field density test shall be within + or - 5% of the fine gravel content of the Proctor sample.

The oversize fraction shall be particles retained on the 3/4" sieve. For oversize fractions greater than 5%, the oversize particles shall be corrected in accordance with the Finer Fraction Method specified in ASTM D 4718.

Each sand cone test shall report the gravel content retained on the No. 4, 3/8" and 3/4" sieve as appropriate for the Proctor method referenced.

Where nuclear testing is used and lack of uniformity in the soil due to layering, rock or voids are suspected, the test volume site shall be dug up and visually examined to determine if the test material is representative of the full material in general and if rock correction is required.

3.14.5 Corrective Action

Tests of materials which do not meet the contract requirements (failing test) will not be counted as part of the required testing. Each such failing test must be retaken at the same location as the failing test was taken. If testing indicates material does not meet the contract requirements, the material represented by the failing test shall not be placed in the contract work or shall be recompacted or removed. The quantity of material represented by the failing test shall be determined by the Contracting Officer up to the quantity represented by the testing frequency. The Contractor may increase testing frequency in the vicinity of the failing test in order to reduce removal requirements, as approved by the Contracting Officer. Such increases in testing frequency shall be at the Contractor's expense and at no additional cost to the Government.

3.14.6 Testing Schedule

a. Moisture-Density Relations (ASTM D 698)

One test for each material variation, not less than 10 tests total.

- b. In-Place Densities (ASTM D 1556 or ASTM D 2922)
 - (1) Typical, 1 test per 2000 CY of fill placed.
- (2) Structure foundations and floor slabs. See SECTION 02315: EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES.
- (3) Utility trench backfill. See SECTION 02316: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS

- (4) Segmental Concrete Retaining Walls over 5-feet in height, not less than 1 test for each 2 vertical feet per 300 linear feet along wall face.
- c. Percent Passing No. 200 sieve (ASTM C 117).
- (1) Select Granular Fill, 1 test per 1000 CY of fill placed, not less than 1 test for each source placed.
- (2) Granular Fill, 1 test per 5000 CY of fill placed, not less than 1 test for each source.
- d. Sieve Analysis, (ASTM C 136)
 - (1) Select Granular Fill, 1 test for each source.
- e. Plasticity Index (ASTM D4318)
 - (1) Cohesive soils, 1 test for each Proctor test.
 - (2) Impervious fill, 1 test per 5000 CY of fill.
- (3) Select impervious fill, 1 test per 5000 CY of fill.
- f. Clay Fraction (percent smaller than $0.002 \ \mathrm{mm}$, determined in accordance with ASTM D 422)
 - (1) Select impervious fill, 1 test per 5000 CY of fill.

3.15 NUCLEAR DENSITY TESTING EQUIPMENT

Nuclear density testing equipment shall be used in general accordance with ASTM D 2922 and ASTM D 3017. In addition, the following conditions shall apply:

- a. Prior to using the nuclear density testing equipment on the site the Contractor shall submit to the Contracting Officer a certification that the operator has completed a training course approved by the nuclear density testing equipment manufacturer, the most recent data sheet from the manufacturere's calibration, and a copy of the most recent statistical check of the standard count precision.
- b. The first test and every tenth test thereafter shall include a sand cone correlation test. The sand cone test shall be centered over the prepared surface for the nuclear test, shall include a nominal 6-inch diameter sand cone, and shall include a minimum wet soil weight of 6 pounds extracted from the hole. In addition, testing of aggregate base soils shall include a minimum of 3 sand cone correlations for each day of testing; and testing of bituminous shall include a minimum of 3 core densities for each day of testing. The density correlations shall be submitted with test results. Each transmittal including density test data shall include a summary of all density correlations for the job neatly prepared on a summary sheet including at a minimum:

- (1) Date, meter serial number and operators initials.
- (2) Standard count and adjustment data for each test.
- (3) Material type.
- (4) Probe depth.
- (5) Moisture content by each test method and the deviation.
- (6) Wet density by each test method and the deviation.
- c. The nuclear density testing equipment shall be capable of extending a probe 6 inches minimum down into a hole. The probe shall generally be extended to the maximum depth obtainable.
- d. Nuclear density testing equipment used within 2 vertical feet from the existing ground water level, 5 horizontal feet from a vertical wall or massive concrete structure, or in a trench shall have the standard count changed before and after each test, or the manufacturers published correction procedure shall be followed.
- e. Nuclear density testing equipment shall not be used during rain.

3.16 SUBGRADE AND EMBANKMENT PROTECTION

Compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified herein to the required density prior to further construction thereon. Subgrades not meeting the specifications for finish, material type and density at the time of surface material placement shall be corrected at the Contractor's expense. Cohesive embankments and subgrades shall be kept crowned or sloped for drainage. Newly graded areas shall be protected from traffic and erosion. Any settlement or washing away that may occur from any cause shall be repaired. No base course or pavement shall be laid until the subgrade has been checked and approved by the Contracting Officer. Ditches and drains along subgrade shall be maintained to provide effective drainage. All work shall implement best management practices for erosion control.

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SECTION 02315

EXCAVATION, FILLING AND BACKFILLING FOR STRUCTURES 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu.m.))
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil, and Rock
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	(1994) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1995a) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 DEGREE OF COMPACTION

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, abbreviated as

percent laboratory maximum density.

Line of protection includes levee, floodwall and closures.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-09 Reports

Testing; FIO.

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

Satisfactory materials for general and structural backfill for structures located on the riverside of the levee and within the line of protection, pump stations, and storm sewer structures shall be comprised of native soils classified by ASTM D 2487 as SC, CL, CL-ML, and CH, unless otherwise shown or specified herein.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified if any contaminated materials are found.

2.1.3 Granular Fill

Granular material shall be satisfactory material containing not more than 12 percent by weight of material passing the No. 200 sieve. For free draining select granular fill, the material shall contain not more than 5 percent by weight of material passing the No. 200 sieve.

2.1.4 Crushed Rock

Crushed rock shall comply with the requirements of MNDOT 3149.2.G Aggregate Bedding.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

Clearing and grubbing is specified in SECTION 02230: CLEARING AND GRUBBING.

3.2 TOPSOIL

Stripping topsoil is specified in SECTION 02300: EARTHWORK.

3.3 EXCAVATION

Excavation shall conform to the dimensions and elevations indicated for each structure, and footing except as specified. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms. Excavations below indicated depths will not be permitted except to remove unsatisfactory material or to aid in dewatering. Unsatisfactory material encountered below the grades shown shall be removed as directed and replaced with satisfactory material; and payment will be made in conformance with the CHANGES clause of SECTION 00700: CONTRACT CLAUSES. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced, at no additional cost to the Government, with satisfactory materials to the indicated excavation grade. Satisfactory material shall be placed and compacted as specified in paragraph FILLING AND BACKFILLING. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

Where wet or otherwise unstable soil incapable of properly supporting the structure, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with satisfactory materials, compacted as provided in paragraph BACKFILLING of this section. When removal of unstable material is due to the fault or neglect of the Contractor in the Contractor's performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.4 DRAINAGE AND DEWATERING

3.4.1 Drainage

Surface water shall be directed away from structure excavation sites to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.4.2 Dewatering

See SECTION 01000: GENERAL for dewatering requirements.

Groundwater flowing toward or into structure excavations shall be

controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the groundwater level in order to maintain the integrity of the in situ material. While the excavation is open, the groundwater level shall be maintained continuously, at least 2 feet below the working level. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.

Crushed rock or granular soils are not allowed beneath structure foundations, unless otherwise shown. Other methods to create a dry, stable subgrade on which to place reinforcement and concrete shall be used that will not create a permeable condition beneath the structure. Remove to the maximum extent possible, pervious materials incorporated into dewatering systems. Prior to placement of backfill the Contracting Officer will determine if materials used in dewatering are removed satisfactorily.

3.5 SHORING

See SECTION 01000: GENERAL for shoring requirements.

3.6 CLASSIFICATION OF EXCAVATION

Excavation will be unclassified regardless of the nature of material encountered.

3.7 BLASTING

Blasting will not be permitted.

3.8 EXCAVATED MATERIALS

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required under this section or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in SECTION 02300: EARTHWORK.

3.9 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Excavation to final grade shall not be made until just before reinforcement or concrete is to be placed. For pile foundations, the excavation shall be stopped at an elevation of from 6 to 12 inches above the bottom of the footing before driving piles. After pile driving has been completed, the remainder of the excavation shall be completed to the elevations shown. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. Shales shall be protected from slaking and all surfaces shall be protected from erosion resulting from ponding or flow of water.

3.10 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified in paragraph FILLING AND BACKFILLING.

3.11 FILLING AND BACKFILLING

Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Satisfactory materials shall be placed in horizontal layers not exceeding 8 inches in loose thickness, or 6 inches when hand-operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as specified. Backfilling shall not begin until construction below finish grade has been approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall not be placed against structure prior to the concrete attaining 70% of its design strength. As far as practicable, backfill shall be brought up evenly on each side of the structure and sloped to drain away from the wall. When there are separate structural and grading contracts, the Structural Contractor shall backfill box culverts and buried structures to an elevation of 2 feet above the top of the structure. The Grading Contractor shall complete the remaining backfill in conjunction with grading operations. Each layer of fill and backfill shall be compacted to not less than the percentage of Standard Proctor maximum density specified

below:

	Percent Laboratory		
	Maximum Density		
	Cohesive	Cohesionless	
	material	material	
Fill, embankment, and			
structure backfill	95	95	
Under structures, structure subgrade, floor slabs, steps, paved areas, around footings, and subgrade	100	100	
Under structures and paved areas, top 12 inches	100	100	

Approved compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified herein before to the required density prior to further construction thereon. Recompaction over underground utilities shall be by hand tamping.

3.12 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Testing shall be performed in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL.

3.12.1 In-Place Densities

In-place density and moisture content test results shall be included with the Contractor's daily construction quality control reports.

3.12.1.1 In-Place Density of Subgrades

Not less than one test per 500 square feet per lift or fraction thereof as determined by the foundation area of each structure.

3.12.1.2 In-Place Density of Fills and Backfills

Not less than 1 test for each 2 vertical feet of fill per 100 linear feet or fraction thereof as determined by the perimeter or circumference of each structure.

3.12.2 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material, including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per source, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density will be made.

3.13 GRADING

Areas within 5 feet outside of each structure line shall be constructed true-to-grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

3.14 TOPSOIL AND SEEDING

Placement of topsoil and seeding is specified in SECTION 02920: SEEDING, SODDING, AND TOPSOIL.

3.15 PROTECTION

Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work, shall be repaired and grades reestablished to the required elevations and slopes.

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06/02

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SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS 06/02

PART 1 GENERAL

1.1 RELATED WORK OF OTHER SECTIONS

Dewatering is covered in SECTON 01000: GENERAL. Material definitions, backfill compaction and testing requirements are covered in SECTION 02300: EARTHWORK, and SECTION 02630: STORM-DRAINAGE SYSTEM.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu.ft.)
ASTM D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2487	(1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

Corps of Engineers (COE)

EM 385-1-1 Safety and Health Requirements Manual

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 Edition and Supplements)

MNDOT 3149 Granular Material

1.3 DEFINITIONS

Reference to pipes shall include culverts. Appurtenant structures include

manholes, inlets, outlets, headwalls, or similar structures.

PART 2 PRODUCTS

2.1 MATERIALS

In addition to the definitions below, material definitions shall be as specified in SECTION 02300: EARTHWORK.

2.1.1 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.2 Unstable Material

Unstable material shall consist of materials too soft and/or compressible to properly support the pipe or appurtenant structure.

2.1.3 Granular Bedding and Drainage Fill

Material consisting of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 12 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 3/4 inch sieve.

2.1.4 Crushed Rock Bedding

Material consisting of well graded gravel, crushed gravel, crushed stone, or crushed slag meeting the gradation requirements of MNDOT 3149.2.G, Aggregate Bedding.

2.1.5 Impervious Fill

See SECTION 02300: EARTHWORK.

PART 3 EXECUTION

3.1 EXCAVATION

Trench excavation shall be by open cut except for storm sewer shown on the plans and identified in SECTION 02630: STORM-DRAINAGE SYSTEM to be installed by jacking techniques. All excavation shall be constructed in accordance with the Safety and Health Requirements Manual (EM 385-1-1) and/or OSHA Standards. Allowable trench widths, depths, side slopes, sheet and bracing requirements, and other considerations are given in the OSHA Standard; and an abbreviated version is given in the Safety and Health Requirements Manual.

Provide full access to public/private premises and fire hydrants so as to

prevent serious disruption of travel. Protect and maintain benchmarks and monuments during excavations.

3.1.1 Trench Excavation

Excavation shall be performed to the lines and grades indicated. Remove existing home foundations, walls, slabs, and other related materials to the extent necessary to install the utility system. During excavation, material satisfactory for backfilling shall be stockpiled in a neat and orderly manner at a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or caving. Topsoil shall be stockpiled separately from suitable backfill material. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized over excavation shall be backfilled at no additional cost to the Government.

3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Pipe shall rest on undisturbed or properly placed and compacted soil along its entire length. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.1.2 Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed 8 inches below the required grade and replaced with granular bedding, except as provided below.

For levees and all utility systems passing through or beneath levees, the replaced fill shall meet the requirements for the zone where it is located. Use of material more pervious than surrounding soils is not acceptable.

3.1.1.3 Unstable Material

Where wet, soft, unsuitable or otherwise unstable soil incapable of properly supporting pipe is encountered in the bottom of a trench or excavation, the Contractor shall immediately contact the Contracting Officer prior to proceeding with the associated work. When removal of unstable material is required due to inadequate shoring and sheeting, water removal, control of ground water or other similar operations, such unstable material shall be excavated and replaced with satisfactory material as directed at no additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for appurtenances shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Removal of unstable material shall be

as specified above. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before concrete is to be placed or appurtanences are to be installed.

3.1.2 Stockpiles

Stockpiles of satisfactory material shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed. Excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government.

3.2 BACKFILLING AND COMPACTION

Backfilling shall not begin until construction below finish grade has been approved, storm drainage systems have been inspected, tested and approved; concrete forms have been removed and the excavation cleaned of frost, trash and debris. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall. Trenches not immediately backfilled to grade shall be sloped to drain if practicable. Heavy equipment for spreading and compacting backfill shall not be operated closer to a foundation or other underground structural element than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted with power driven hand tampers suitable for the material being compacted.

3.2.1 Levees

Where pipes are located within the right of way of levees, all fill materials shall meet the type and classification for the fill zone shown on drawings, otherwise use same type of material for the zone where the trench is located. The portion of the trench in native soils shall be backfilled with the excavated material that matches the surrounding soils.

3.2.2 Bedding and Initial Backfill

Bedding shall be of the type and thickness shown. Initial backfill material shall be placed and compacted to 95% of Standard Proctor density with manual tampers to a height above the pipe necessary to prevent damage, but not less than one foot. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.2.3 Final Backfill

Final backfill is all material necessary to complete backfilling at the trench above the bedding and initial backfill. Final backfill shall consist of native impervious fill, unless otherwise required beneath pavements, adjacent to structures or other project features. Placement and compaction of final backfill shall comply with the requirements listed in SECTION 02300: EARTHWORK for the fill zone or feature in which the utility trench is located.

3.2.4 Backfill for Appurtenances

After the structure has been constructed and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.3 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.3.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer.

3.3.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 698. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.3.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test for each 2 vertical feet of backfill for every 300 feet of installation shall be performed. One moisture density relationship shall be determined for every 1500 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 1556 and ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph "Calibration" of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soils. The calibration curves furnished with the gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. Copies of

calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

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SECTION 02373

SEPARATION GEOTEXTILE

06/02

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SECTION 02373

SEPARATION GEOTEXTILE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3786	(1987) Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method
ASTM D 4354	(1996) Sampling of Geosynthetics for Testing
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1995) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4759	(1988; R 1996) Determining the Specification Conformance of Geosynthetics
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The

following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-06 Instructions

Manufacturing Quality Control Sampling and Testing; FIO.

A minimum of 14 days prior to scheduled use, manufacturer's quality control manual including instructions for geotextile storage, handling, installation, seaming, and repair.

SD-13 Certificates

Geotextile; GA

A minimum of 14 days prior to scheduled use, manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. This submittal shall include copies of manufacturer's quality control test results. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturer.

1.3 DELIVERY, STORAGE AND HANDLING

Delivery, storage, and handling of geotextile shall be in accordance with ASTM D 4873.

1.3.1 Delivery

The Contracting Officer will be present during delivery and unloading of the geotextile. Rolls shall be packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. If quality assurance samples are collected, rolls shall be immediately rewrapped with the plastic wrapping. Geotextile or plastic wrapping damaged during storage or handling shall be repaired or replaced, as directed. Each roll shall be labeled with the manufacturer's name, geotextile type, roll number, roll dimensions (length, width, gross weight), and date manufactured.

1.3.2 Storage

Geotextile rolls shall be protected from becoming saturated. Rolls shall either be elevated off the ground or placed on a sacrificial sheet of plastic. The geotextile rolls shall also be protected from the following: construction equipment, ultraviolet radiation, chemicals, sparks and flames, temperatures in excess of 160 degrees F, and any other environmental condition that may damage the physical properties of the geotextile.

1.3.3 Handling

Geotextile rolls shall be handled and unloaded with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 RAW MATERIALS

2.1.1 Geotextile

Geotextile shall be a woven pervious sheet of polymeric material and shall consist of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Stabilizers and/or inhibitors shall be added to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Post-consumer recycled material shall not be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the selvages. Geotextiles and factory seams shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values.

TABLE 1. GEOTEXTILE PHYSICAL PROPERTIES

	1501	٧A	LUE
ess Than 15	ASTM	D	4632
70	ASTM	D	4751
0.1	ASTM	D	4491
90	ASTM	D	4833
250	ASTM	D	4632
90	ASTM	D	4533
350	ASTM	D	3786
50 t 500 hours)	ASTM	D	4355
	70 0.1 90 250 90	70 ASTM 0.1 ASTM 90 ASTM 250 ASTM 90 ASTM 50 ASTM	70 ASTM D 0.1 ASTM D 90 ASTM D 250 ASTM D 90 ASTM D 350 ASTM D

2.1.2 Thread

Sewn seams shall be constructed with high-strength polyester, nylon, or other approved thread type. Thread shall have ultraviolet light stability equivalent to the geotextile and the color shall contrast with the geotextile.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Subgrade Preparation

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile. Subgrade materials and compaction requirements shall be in accordance with Section 02722: AGGREGATE BASE OR SURFACE COURSE.

3.1.2 Placement

The Contractor shall request the presence of the Contracting Officer during handling and installation. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile shall be laid flat and smooth so that it is in direct contact with the subgrade. The geotextile shall also be free of tensile stresses, folds, and wrinkles. On slopes greater than 5 horizontal on 1 vertical, the geotextile shall be laid with the machine direction of the fabric parallel to the slope direction.

3.2 SEAMS

3.2.1 Overlap Seams

Overlapping is not permitted. Sewn seams shall be used to connect all geotextile panels.

3.2.2 Sewn Seams

Seams shall be continuously sewn using a J-type seam with two rows of a 401 locking chain stitch. The minimum distance from the geotextile edge to the stitch line nearest to that edge shall be 3 inches unless otherwise recommended by the manufacturer. The thread at the end of each seam run shall be tied off to prevent unraveling. Seams shall be on the top side of the geotextile to allow inspection.

3.3 PROTECTION

The geotextile shall be protected during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Adequate ballast (e.g. sand bags) shall be used to prevent uplift by wind. The geotextile shall not be left uncovered for more than 2 days during installation.

3.4 REPAIRS

Geotextile damaged during installation shall be repaired by placing a patch of the same type of geotextile which extends a minimum of 12 inches beyond the edge of the damage or defect. Patches shall be continuously fastened using a sewn seam or other approved method. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Geotextile which cannot be repaired shall be replaced.

3.5 PENETRATIONS

Engineered penetrations of the geotextile shall be constructed as shown on the drawings.

3.6 COVERING

Geotextile shall not be covered prior to approval by the Contracting Officer. The Contractor shall request the presence of the Contracting Officer during covering of the geotextile. Cover soil shall be placed in a manner that prevents wrinkles from folding over onto themselves. No equipment shall be operated directly on top of the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment tires/tracks and the geotextile during the covering process.

-- End of Section --

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SECTION 02378

GEOTEXTILE FILTERS

06/02

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SECTION 02378

GEOTEXTILE FILTERS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 123	(1996a) Standard Terminology Relating to Textiles
ASTM D 4354	(1996) Sampling of Geosynthetics for Testing
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1999) Water Permeability of Geotextiles By Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls
ASTM D 4884	(1996) Strength of Sewn or Thermally Bonded Seams of Geotextiles

U.S. ARMY CORPS OF ENGINEERS, ENGINEERING MANUALS (EM)

EM 1110-2-1601 (1991; Change 1-1994) Hydraulic Design of Flood Control Channels

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Geotextile; GA

Submit the manufacturer's certification of the geotextile material. All brands of geotextile and all seams to be used will be accepted on the basis of mill certificates or affidavits. Submit duplicate copies of the mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification.

SD-14 Samples

1.3 SHIPMENT, HANDLING, AND STORAGE

1.3.1 Shipment and Storage

Only approved geotextile rolls shall be delivered to the project site. All geotextile shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873. No hooks, tongs, or other sharp instruments shall be used for handling geotextile.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Geotextile

2.1.1.1 General

The geotextile shall be a non-woven pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall equal or exceed the minimum average roll values listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR GEOTEXTILE FILTERS. Strength values indicated in the table are for the weaker principal direction.

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR GEOTEXTILE FILTERS

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAB STRENGTH	lb	180	ASTM D 4632
SEAM STRENGTH	lb	180	ASTM D 4632

PUNCTURE	MINIMUM	PHYSICAL lb	REQUIREMENTS	FOR 80	GEOTEXTILE	FILTERS ASTM D	4833
TRAPEZOID	TEAR	lb		50		ASTM D	4533
APPARENT (OPENING	U.S. SIEV	 VE	100)	ASTM I	 D 4751
PERMITTIV	 ITY	sec -1		0.	1	ASTM I	 D 4491

TABLE 1

2.1.1.2 Geotextile Fiber

Fibers used in the manufacturing of the geotextile shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of polyolefins, polyesters, or polyamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

2.1.2 Seams

The seams of the geotextile shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn or shall be bonded by cementing or by heat. The sheets of geotextile shall be attached at the factory or another approved location, if necessary, to form sections not less than 12 feet wide. Seams shall be tested in accordance with method ASTM D 4884. The strength of the seam shall be not less than the required grab tensile strength of the unaged geotextile in any principal direction.

2.1.3 Securing Pins

The geotextile shall be secured to the embankment or foundation soil to prevent movement prior to placement of revetment materials. Appropriate means to prevent movement such as pins, staples, sand bags, and stone shall be used. When used securing pins and staples, the pins or staples shall be inserted through the geotextile along the line passing through the midpoint of the seam locations. Securing pins and staples shall be removed as placement of revetment materials are placed to prevent tearing of geotextile or enlarging holes.

Spacing between securing geotextile depends on the steepness of the embankment slope. The maximum spacing shall be equal to or less than the values listed in TABLE 2, MAXIMUM SPACING FOR SECURING GEOTEXTILE. When windy conditions prevail at the construction site, the spacing should be decreased upon the demand of the Contracting Officer. Terminal ends of the geotextile shall be anchored with key trench or apron at crest, toe of the slope and upstream and downstream limits of installation.

TABLE 2
MAXIMUM SPACING FOR SECURING GEOTEXTILE

EMBANKMENT	SPACING, feet
STEEPER THAN 1V ON 3H	2
1V ON 3H TO 1V ON 4H	3
FLATTER THAN 1V ON 4H	5

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surface on which the geotextile will be placed shall be prepared to a relatively smooth surface condition, in accordance with the applicable portion of this specification and shall be free from obstruction, debris, depressions, erosion feature, or vegetation. Any irregularities will be removed so as to insure continuous, intimate contact of the geotextile with all the surface. Any loose material, soft or low density pockets of material, will be removed; erosion features such as rills, gullies etc. must be graded out of the surface before geotextile placement.

3.2 INSTALLATION OF THE GEOTEXTILE

3.2.1 General

The geotextile shall be placed in the manner and at the locations shown. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.

3.2.2 Placement

The geotextile shall be placed smooth and free of tension, stress, folds, wrinkles, or creases. Temporarily secure the geotextile to help hold it in place until the bedding layer is placed shall be allowed. The temporary securing measures shall be removed as the bedding is placed to relieve high tensile stress which may occur during placement of material on the geotextile. Trimming shall be performed in such a manner that the geotextile shall not be damaged in any way.

3.3 PROTECTION

The geotextile shall be protected at all times during construction from contamination by surface runoff and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of bedding materials shall be replaced by the Contractor at no cost to the Government and the work shall be scheduled so that the covering of the geotextile with a layer

of the specified material is accomplished within 2 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of riprap or other materials. Before placement of riprap or other materials, the Contractor shall demonstrate that the placement technique will not cause damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

3.4 OVERLAPPING AND SEAMING

3.4.1 Overlapping

The overlapping of geotextile is not allowed. Seaming will be required.

3.4.2 Sewn Seams

Seam geotextile panels together with a J-type seam using two rows of 401 locking chain stitches.

High strength thread should be used such that seam test should conform to ASTM D 4884. The thread shall meet the chemical, ultraviolet, and physical requirements of the geotextile, and the color shall be different from that of the geotextile. The seam strength shall be equal to the strength required for the geotextile in the direction across the seam.

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SECTION 02388

STONE PROTECTION (RIPRAP)

06/02

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SECTION 02388

STONE PROTECTION (RIPRAP) 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4992 (1994) Evaluation of Rock to be Used for Erosion Control

U.S. ARMY CORPS OF ENGINEERS, ENGINEERING MANUALS (EM)

EM 1110-2-1601 (1991) Hydraulic Design of Flood Control Channels

EM 1110-2-1906 (Nov. 1970) Laboratory Soils Testing with Change 1 (May, 1980) and Change 2 (Aug. 1986).

EM 1110-2-2302 (1990) Construction with Large Stone

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44 (1997) NIST Handbook 44: Specifications,
Tolerances, and Other Technical
Requirements for Weighing and Measuring
Devices

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Material Sources; GA.

The Contractor shall designate in writing only one source or one combination of sources from which he proposes to furnish stone. The Contractor shall state in writing methods of processing and handling riprap, and shall notify the Contracting Officer when production methods

are changed.

SD-09 Reports

Gradation Test; FIO.

Gradation Test Results for riprap and aggregates. Riprap gradation and riprap bedding testing results shall be submitted on the WORKSHEET FOR GRADATION ANALYSIS OF RIPRAP (Form 4055) and GRADATION CURVES FOR RIPRAP FILTER AND BEDDING (Form 4056). A blank copy of each form is included at the end of this section.

SD-13 Certificates

Certified Weight Scale Tickets; FIO.

Copies of all certified weight scale tickets shall be furnished to the Contracting Officer at a frequency as directed. The tickets do not need to be formally submitted through the submittal process.

PART 2 PRODUCTS

2.1 STONE SOURCES AND EVALUATION

Stone and aggregate materials may be quarried rock or durable fieldstone and shall be produced or obtained from the sources listed in SECTION 00830: ATTACHMENTS. If the Contractor proposes to furnish materials from a source not listed, the Government Geologist will make such investigations and evaluations as necessary to determine whether or not materials with acceptable durability can be produced from the proposed source. The rock supplied shall be composed of a quality fieldstone or be quarried from one rock formation to provide a product of uniform appearance. The Contractor shall not supply rock from various formations, or mix field stone with quarried rock, unless approved by the Contracting Officer. It is the Contractor's responsibility to determine that the stone source or combination of sources selected is capable of providing the quality, quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work.

2.1.1 Alternate Sources

If the Contractor proposes to furnish stone materials from a source not listed in SECTION 00830: ATTACHMENTS, the Government Geologist will make such investigations and evaluations as necessary to determine whether or not materials meeting the requirements specified can be produced from the proposed source. Alternate sources from which the Contractor proposes to obtain stone materials shall be selected and submitted for approval at least 30 days in advance of the time when the material will be required.

2.1.2 Acceptance of Materials

Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials

are unsuitable for stone as determined by the Contracting Officer. The Contracting Officer also reserves the right to reject individual units of produced specified materials in stockpiles at the quarry, all transfer points, and at the project construction site when such materials are determined to be unsuitable.

2.2 RIPRAP

Riprap gradation shall meet the requirements for R270 riprap indicated on the attached FORM 4055. The stone shall be well graded within the limits specified.

2.2.1 General

All stone shall be durable material. Stone for riprap shall have a specific gravity between 2.55 and 2.75 unless approved by the Contracting Officer. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its deterioration from natural causes. The stone shall be clean and reasonably free from soil, quarry fines, and shall contain no refuse. Any foreign material adhering to or combined with the stone as a result of stockpiling shall be removed prior to placement. Neither the breadth nor the thickness of any piece of stone shall be less than one-third of it's length. Occasional pieces of stone slightly larger than the maximum weight will be permitted provided the gradation and voids are not unduly affected and that surface tolerances are met.

2.2.2 Production

Riprap shall be handled and selectively loaded onto trucks in a manner to avoid segregation and provide a distribution of stone sizes consistent with the gradation band and test samples. Each truckload shall be representative of the gradation requirements.

2.3 RIPRAP BEDDING

Riprap bedding gradation shall meet the requirements listed in Table 1.

Table 1

Riprap Bedding

_		_	'	

Sieve Size	Percent Finer By Weight
9 "	100
6 "	80 to 100
3 "	55 to 85
1"	35 to 55
No. 4	10 to 35
No.10	0 to 25
No.40	0 to 10
No.200	0 to 5

2.3.1 General

All stone shall be durable material. Stone for riprap shall have a specific gravity between 2.55 and 2.75 unless approved by the Contracting Officer. Stone shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, blast fractures, bedding, seams and other defects that would tend to increase its deterioration from natural causes. The stone shall be clean and reasonably free from soil, quarry fines, and shall contain no refuse.

2.3.2 Production

Riprap bedding shall be handled and selectively loaded onto trucks in a manner to avoid segregation and provide a distribution of stone sizes consistent with the gradation band and test samples. Each truckload shall be representative of the gradation requirements.

2.4 GEOTEXTILE

Geotextile shall meet the requirements of Section 02378 Geotextile Filter.

2.5 SOURCE QUALITY CONTROL

Sampling and testing shall be performed by and at the expense of the Contractor at no additional cost to the Government. Gradation tests shall be performed by either Method A or B at the frequency listed below. A satisfactory gradation test shall be obtained prior to any hauling and delivery of materials. All tests, including failing tests shall be submitted. Tests performed on material which do not meet gradation and shape requirements will not be counted as part of the tests required. The Contracting Officer shall be informed immediately of test results and draft copies of test results shall be furnished at the Contracting Officers request.

2.5.1 Sampling Requirements

The Contracting Officer shall direct the time and location of sampling, unless waived. Samples shall be taken from stockpiles or loaded trucks, and not directly from conveyers or chutes.

2.5.2 Gradation Testing

Perform gradation tests on riprap and riprap bedding as required below.

2.5.2.1 Riprap

- a. Notification. The Contracting Officer shall be informed 24 hours before each riprap test.
- b. Testing frequency. At least 1 gradation test shall be performed per source prior to delivery to the project site. Perform 1 test of riprap stockpiled or delivered to the project site.
- c. Sample Size. The sample shall have a minimum gross weight not less

than 25 times the maximum stone size in the specified gradation (25 * W 100).

2.5.2.2 Riprap Test Method A

Test method A shall consist of weighing all stones larger than 5 pounds in a sample. Five to seven weight classes shall be selected within the range of stone sizes. Each stone shall be weighed and recorded on the work sheet for method A. The weight of stones shall be summed for each weight class; after which calculations and a plot of the gradation shall be completed in accordance with accepted practice for soil and aggregate gradations.

2.5.2.3 Riprap Test Method B

Test method B shall consist of separating the stones into 5 to 7 piles, ordered by size. The sample shall be separated on a clean, hard surface that is free of smaller stones that could become mixed with the sample. The stones shall be visually screened to place them into appropriate piles. All stones shall be separated and placed into a pile before weighing. After separating, the smallest and largest rock in each pile shall be weighed and recorded. The stones shall be adjusted as necessary so that the weight classes do not overlap. After adjustment is adequate and weight classes have been established, each pile of stone shall be weighed and recorded on the work sheet for method B. Calculations and a plot of the gradation shall be completed in accordance with accepted practice for soil and aggregate gradations.

2.5.2.4 Riprap Bedding

- a. Notification. The Contracting Officer shall be informed 24 hours before each riprap test.
- b. Testing frequency. At least 1 gradation test shall be performed per source prior to delivery to the project site. Perform 1 test of riprap stockpiled or delivered to the project site.
- c. Sample size. The sample shall have a minimum gross weight of 150 pounds.

2.5.2.5 Gradation Tests for Riprap Bedding

The sampling and testing procedures for gradation tests for bedding shall be in accordance with EM 1110-2-1906. Report results on ENG FORM 4056, GRADATION CURVES, provided at the end of this section.

2.6 STOCKPILES

Stockpiles shall be formed by a series of layers or truckload dumps, where the rock essentially remains where it is placed. Subsequent layers shall be started 10 feet from the edge of the previous layer so that the rock will not roll down the edges of the pile. Any stone which has become contaminated with soil or refuse shall not be put into the work unless the contaminating material has been removed prior to placement.

PART 3 EXECUTION

3.1 CONSTRUCTION TOLERANCES

Work shall generally meet the required elevations, slope and grade; and the outer surfaces shall be even and present a neat appearance.

3.1.1 Subgrades

Areas on which stone protection will be placed shall be graded and/or dressed to conform to cross sections shown on the contract drawings within 2 inches above or below the neat lines. The surface shall be reasonably smooth to match tolerances normally obtained by rough grading with bladed equipment. For subaqueous construction in greater than 3 feet of water, the tolerance shall be 6 inches.

3.1.2 Layer Thickness

Any layers found to be less than 80% of the specified thickness shall be corrected. This tolerance shall only be exceeded on isolated spot checks, and if the tolerance is commonly exceeded, the Contractor shall change his construction methods to improve the quality control. If it is necessary to estimate riprap quantities for changes, the volume shall be based on neat line dimensions and the plan dimension for thickness. A conversion factor of 1.5 tons/CY shall be used to determine quantity requirements, unless otherwise directed by the Contracting Officer.

3.1.3 Surface Tolerances

The finished surface tolerance above the neat line shall generally not deviate from the lines and grades shown by more than half (1/2) the average stone dimension of the gradation range. Riprap that has a rough and uneven surface shall be reworked by hand to stabilize stones that wobble and are out of tolerance, except where the Contracting Officer approves use of equipment. Rearranging of individual stones shall be required to the extent necessary to obtain a well-graded distribution of stone sizes.

3.2 FOUNDATION PREPARATION

Foundation areas shall be excavated or filled to the lines and grades shown. Filling shall be with earth similar to the adjacent material and shall be well compacted. Immediately prior to placing riprap, the prepared subgrade will be inspected by the Contracting Officer unless waived; and no material shall be placed thereon until that area has been approved.

3.3 PLACEMENT OF RIPRAP

3.3.1 Layer Requirements

Riprap shall be placed in a manner which will produce a well-graded mass of rock with the minimum practicable percentage of voids. The large stones shall be well distributed. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones.

3.3.2 Construction Methods

Unsegregated stone shall be placed in a systematic manner. Riprap shall be placed to its full course thickness in one operation and in such manner as to avoid displacing underlying material. Placement shall typically begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. Final finish of slope shall be performed as the material is placed.

Placing riprap in layers will not be permitted. Placing riprap by dumping it into chutes, or by any method likely to cause segregation of the various sizes, shall not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope shall not be permitted. No equipment shall be operated directly on the completed stone protection system. Dump trucks shall be equipped with bottom hinged tailgates if rock is directly placed into position with the trucks.

3.3.3 Riprap Placement on Geotextile

Riprap shall be placed over the geotextile by methods that do not tear, puncture, or reposition the fabric. Equipment shall be operated so as to minimize the drop height of the stone without contacting and damaging the geotextile. Generally this will be about 1 foot of drop from the bucket to the placement surface. Riprap shall be placed so that stones do not roll downhill.

3.4 MAINTENANCE

The Contractor shall maintain the stone protection and underlying works until accepted by the Contracting Officer. When appropriate, the Contractor shall place stone protection in a timely manner to reduce risk of scour. Any material displaced prior to acceptance and due to the Contractor's negligence or neglect shall be replaced at the Contractor's expense.

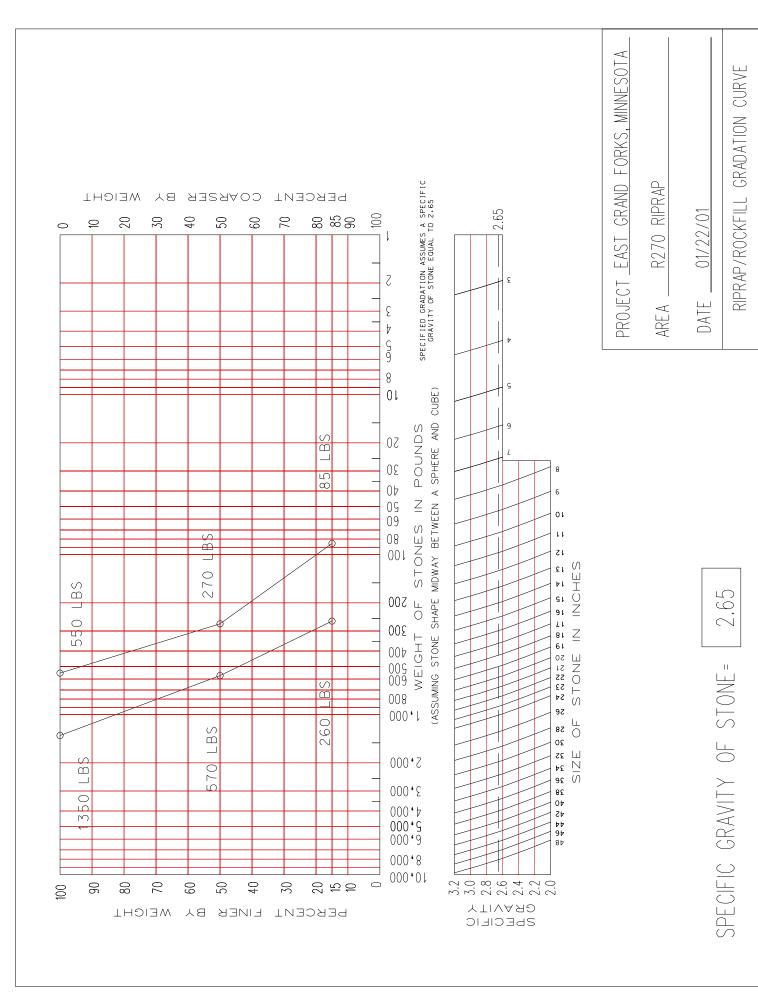
3.5 CONTRACTOR QUALITY CONTROL

The Contractor shall establish and maintain quality control for all work performed at the job site under this section to assure compliance with contract requirements. He shall maintain records of his quality control tests, inspections and corrective actions. Quality control measures shall cover all construction operations including, but not limited to, the placement of all materials to the slope and grade lines shown and in accordance with this section.

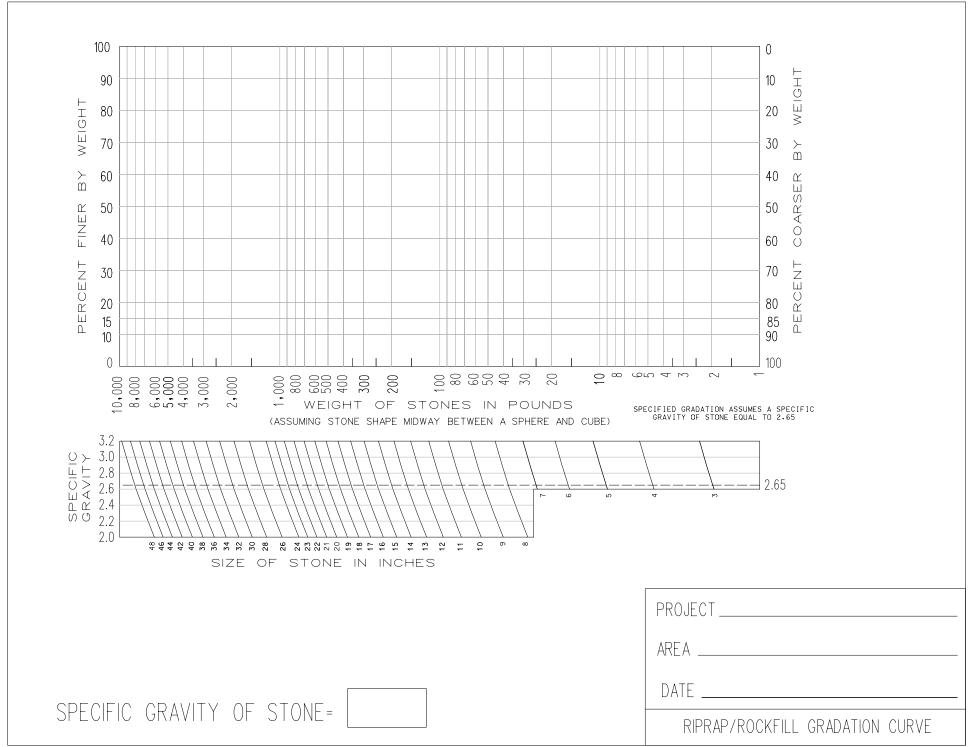
In addition to the Contractor's system to establish and maintain quality control for stone placement operations, the following information shall be recorded and promptly provided to the Contracting Officer on request:

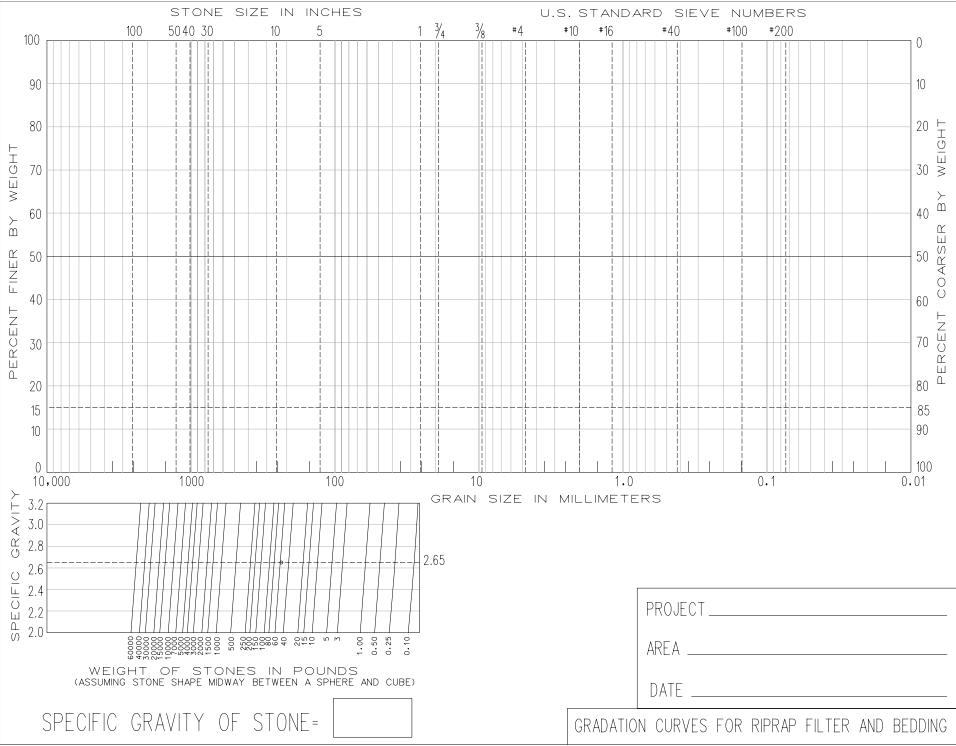
- a. Record tonnage of stone placed in completed sections of the work and check quantity for compliance with design sections.
- b. Check for uniform thickness of material layers.

-- End of Section --



ENGR FORM 4055 COMPUTER GENERATED DATE OF FORM: MAY 1998





WORK SHEET FOR GRADATION ANALYSIS OF RIPRAP METHOD A

Project Name:	Date:
Riprap Type:	Test No.
Source, Quarry, or Pit:	
Sample Location:	Test Made By:

Part 1. Weigh all stones larger than 5 pounds and record.

(1) PASSING WT.				5 lbs.
(2) RETAINED WT.			5 lbs.	PAN
(3)				
(4) TOTALS				

Rows (1) & (2) Enter 5 to 7 weight classes to yield approx. 75%, 50%, 30%, and 15% finer points.

Row (3) List weight of each stone. Attach additional sheets if necessary.

Row (4) Add all individual stone weights listed in each column.

Part 2. Summary Table.

(5) WEIGHT CLA	CLASSES (6)		IGHT CLASSES (6) (7) (8		(8)
PASSING	RETAINED	TOTAL WEIGHT	CUMMULATIVE	TOTAL PERCENT	
(stone wt.	(stone wt.	EACH CLASS	WEIGHT PASSING	PASSING	
in lbs.)	in lbs.)	(lbs.)	(lbs.)	(%)	
	5 lbs.				
5 lbs.	PAN				
SAMPLE TOTAL					

Column (5) Enter same weight classes used in Rows (1) and (2).

Column (6) Enter weights of material from Row (4)

Column (7) Add column (6) from bottom up to get cumulative weight passing.

Column (8) Divide column (7) by sample total to get total percent passing.

WORK SHEET FOR GRADATION ANALYSIS OF RIPRAP METHOD B

Project Name:	Date:
Riprap Type:	Test No.
Source, Quarry, or Pit:	
Sample Location:	Test Made Bv

Part 1. Separate rock into 5 to 7 piles, ordered by size. The largest pile should contain 2 to 5 stones. Intermediate piles between the largest stones and those smaller than 5 pounds should be approximately equal in total weight. Separate all stones before weighing.

Part 2. Summary Table.

(1) WEIGHT CLA	(1) WEIGHT CLASSES (2)		(3)	(4)
PASSING	RETAINED	TOTAL WEIGHT	CUMMULATIVE	TOTAL PERCENT
(stone wt.	(stone wt.	EACH CLASS	WEIGHT PASSING	PASSING
in lbs.)	in lbs.)	(lbs.)	(lbs.)	(%)
	5 lbs.			
5 lbs.	PAN			
SAMPLE TOTAL				

Column (1) Weight the smallest and largest stone in each pile. If weight classes overlap, adjust stones as necessary and repeat.

Column (2) Weigh the total amount of rock in each pile and record.

Column (3) Add column (2) from bottom up to get cumulative weight passing.

Column (4) Divide column (3) by sample total to get total percent passing.

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SECTION 02464

METAL SHEET PILING

06/02

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SECTION 02464

METAL SHEET PILING 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 6	(1995b) General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
ASTM A 36	(1996) Carbon Structural Steel
ASTM A 325	Structural Bolts, Steel, Heat Treated, .20/105 ksi Minimum Tensile Strength
ASTM A 328	(1993a) Steel Sheet Piling

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	Structural	Welding	Codes	5	
AWS D2.3	Structural	Welding	Code	Sheet	Steel

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Metal Sheet Piling; GA.

Detail drawings for sheet piling including fabricated sections shall show complete piling dimensions and details, driving sequence and location of installed piling. Detail drawings shall include details and dimensions of templates and other temporary guide structures for installing piling. Detail drawings shall provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

Pile Driving Equipment; GA

Complete descriptions of sheet piling driving equipment including hammers, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.

SD-08 Statements

Pulling and Redriving; GA.

The proposed method of pulling sheet piling shall be submitted and approved prior to pulling any piling.

Interlocked Joint Strength in Tension Test; GA

The procedure for testing sheet piling interlocked joint strength in tension shall be submitted and approved prior to testing piling.

Materials Tests; FIO.

Certified materials tests reports showing that sheet piling and appurtenant metal materials meet the specified requirements shall be submitted for each shipment and identified with specific lots prior to installing materials. Material test reports shall meet the requirements of ASTM A 6.

SD-18 Records

Driving; FIO.

Records of the sheet piling driving operations shall be submitted after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling. The format for driving records shall be as directed.

1.3 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling as required by the referenced specifications. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of sheet piling should also facilitate required inspection activities. Sheet piling over 80 feet in length shall be handled using a minimum of two pickup points.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

Metal sheet piling shall be continuously interlocking hot-rolled steel sections conforming to ASTM A 328. The interlocks of sheet piling shall be

free-sliding, provide a swing angle suitable for the intended installation but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed. Fabricated bends, tees, wyes and cross pieces shall be fabricated as appropriate with ASTM A 328 piling, and shall be fabricated from matching pieces of sheet piling, ASTM A 36 plates or angles, and ASTM A 325 high strength bolts. The web thickness and the welded or bolted connection shear and tension capacity shall meet or exceed that of the piece to which it connects. Sheet piling shall be provided with standard pulling holes. The PZ designation is listed for identifier only. Pieces, including fabricated sections, shall be of the type indicated in the Drawings with minimum properties as listed in the following table.

Minimum Properties of Pile Sections

Type of	Nominal Web	Section Modulus	Weight per Square
Section	Thickness (Inches)	per Lineal Foot of	Foot of Wall
		Wall (Cubic Inches)	(lbs)
PZ-22	0.310	14	19
PZ-40	0.450	59	39

Metalwork fabrication for sheet piling shall be as specified and in SECTION 05055: METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.2 WELDING ELECTRODES

AWS D1.1 and AWS D2.3 E70 Electrode.

2.3 APPURTENANT METAL MATERIALS

Metal plates, shapes, bolts, nuts, rivets and other appurtenant fabrication and installation materials shall conform to manufacturer's standards and to the requirements specified in the respective sheet piling standards and in SECTION 05055: METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS

2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.4.1 Material Tests

Material tests shall conform to the following requirements. Sheet piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site. Testing of sheet piling for mechanical properties shall be performed after the completion of all rolling and forming operations. Testing of sheet piling shall meet the requirements of ASTM A 6.

2.4.2 Interlocked Joint Strength in Tension Test

The interlocked joint strength in tension test shall conform to the piling manufacturer's standard test, include testing at least two 3 inch long coupons taken randomly from different as-produced pilings of each heat and must be approved.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving Equipment

Pile driving equipment shall conform to the following requirements.

3.1.1.1 Driving Hammers

Hammers shall be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type. The driving energy of the hammers shall be as recommended by the manufacturer for the piling weights and lengths and the subsurface materials to be encountered.

3.1.2 Placing and Driving

3.1.2.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings to be placed in cofferdam cells and connecting arcs shall be picked up and completely threaded to demonstrate that they slide freely in interlock. Pilings shall be carefully located as directed by Soils Engineer. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Temporary wales, templates, master pilings, current deflectors, or guide structures shall be provided to insure that the pilings are placed and driven to the correct alignment. At least two templates shall be used in placing each piling and the maximum spacing of templates shall not exceed 20 feet. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

3.1.2.2 Driving

Prior to driving pilings in water a horizontal line shall be painted on both sides of each piling at a fixed distance from the bottom so that it shall be visible above the water line after installation. This line shall indicate the profile of the bottom elevation of installed pilings and potential problem areas can be identified by abrupt changes in its elevation. Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths. Caution shall be taken in the sustained use of vibratory hammers when a hard driving condition is encountered to avoid interlock-melt or damages. The use of vibratory hammers should be discontinued and impact hammers employed when the penetration rate due to vibratory loading is one foot or less per minute. Pilings damaged during driving or driven out of interlock shall be removed and replaced at the Contractor's expense. Damaged sheet piles include but

are not necessarily limited to sheet piles bent, buckled, cracked, with fabrication tolerances beyond those indicated in ASTM A 328, or with any other defect as determined by the Engineer would weaken the sheet pile. Piling shall be driven without the aid of a water jet. Adequate precautions shall be taken to insure that pilings are driven plumb. If at any time the forward or leading edge of the piling wall is found to be out-of-plumb in the plane of the wall the piling being driven shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures shall be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1/8 inch per foot of length. Pilings in each run or continuous length of piling wall shall be driven alternately in increments of depth to the required depth or elevation. No piling shall be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. If the piling next to the one being driven tends to follow below final elevation it may be pinned to the next adjacent piling. At least the first two sheets of the connecting arcs adjacent to the main cells shall be driven in the cofferdam cells prior to filling the cells. Pilings shall not be driven within 100 feet of concrete less than 7 days old.

3.1.3 Splicing

Pilings adjoining spliced pilings shall be full length unless otherwise approved. Splicing of pilings shall be as indicated. Ends of pilings to be spliced shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips or camber at the abutting interlocks. Spliced pilings shall be free sliding and able to obtain the maximum swing with contiguous pilings. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods which will not damage the surrounding metal. All holes in steel pilings on the wet side of cofferdams shall be made watertight by welding steel plates over the holes after the piling installation is completed.

3.1.4 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.2 REMOVAL

3.2.1 Pulling

The method of pulling piling must be approved. Pulling holes shall be provided in pilings as required. Extractors shall be of suitable type and size. Care shall be exercised during pulling of pilings to avoid damaging piling interlocks and adjacent construction. If the Contracting Officer determines that adjacent permanent construction has been damaged during pulling the Contractor will be required to repair this construction at no cost to the Government. Pilings shall be pulled one sheet at a time. Pilings fused together shall be separated prior to pulling unless the

Contractor demonstrates to the satisfaction of the Contracting Officer that the pilings cannot be separated. The Contractor will not be paid for the removal of pilings damaged beyond structural use due to proper care not being exercised during pulling.

-- End of Section --

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SECTION 02510

WATER DISTRIBUTION SYSTEM

06/02

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SECTION 02510

WATER DISTRIBUTION SYSTEM 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 53	(1998) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded, and Seamless
ASTM B 88	(1996) Seamless Copper Water Tube
ASTM B 88M	(1996) Seamless Copper Water Tube (Metric)
ASTM C 76	(1998) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 76M	(1998) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric)
ASTM D 1599	(1988; R 1995) Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings
ASTM D 1784	(1999) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 1785	(1996b) Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2241	(1996b) Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D 2464	(1996a) Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2466	(1997) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40

ASTM D 2467	(1996a) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	
ASTM D 2564	(1996a) Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems	
ASTM D 2657	(1997) Heat Fusion Joining Polyolefin Pipe and Fittings	
ASTM D 2774	(1994) Underground Installation of Thermoplastic Pressure Piping	
ASTM D 2842	Test Method for Water Absorption of Rigid Plastics	
ASTM D 2855	(1996) Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings	
ASTM D 2996	(1995) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe	
ASTM D 2997	(1995) Centrifugally Cast "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pipe	
ASTM D 3139	(1998) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	
ASTM D 3839	(1994a) Underground Installation of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe	
ASTM D 4161	(1996) "Fiberglass"(Glass-Fiber-Reinforced Thermosetting Resin) Pipe Joints Using Elastomeric Seals	
ASTM F 477	(1996a) Elastomeric Seals (Gaskets) for Joining Plastic Pipe	
ASTM F 1483	(1998) Oriented Poly(Vinyl Chloride), PVCO, Pressure Pipe	
ASME INTERNATIONAL (ASME)		
ASME B1.20.1	(1983; R 1992) Pipe Threads, General Purpose (Inch)	
ASME B16.1	(1989) Cast Iron Pipe Flanges and Flanged Fittings	
ASME B16.3	(1992) Malleable Iron Threaded Fittings	

ASME B16.26	(1988) Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B36.10M	(1996) Welded and Seamless Wrought Steel Pipe
AMERICAN WATER WORKS	ASSOCIATION (AWWA)

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA B3	300	(1992) Hypochlorites
AWWA B3	301	(1992) Liquid Chlorine
AWWA C1	04	(1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C1	.05	(1993) Polyethylene Encasement for Ductile-Iron Pipe Systems
AWWA C1	10	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C1	11	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C1	.15	(1996) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C1	.51	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C1	.53	(1994; Errata Nov 1996) Ductile-Iron Compact Fittings, 3 In. Through 24 In. (76 mm through 610 mm) and 54 In. through 64 In. (1,400 mm through 1,600 mm) for Water Service
AWWA C2	200	(1997) Steel Water Pipe - 6 In. (150 mm) and Larger
AWWA C2	203	(1997) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C2	205	(1995) Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied
AWWA C2	207	(1994) Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)
AWWA C2	208	(1996) Dimensions for Fabricated Steel

		Water Pipe Fittings
AWWA	C300	(1997) Reinforced Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
AWWA	C301	(1992) Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
AWWA	C303	(1995) Concrete Pressure Pipe, Bar-Wrapped, Steel Cylinder Type
AWWA	C500	(1993; C500a) Metal-Sealed Gate Valves for Water Supply Service
AWWA	C502	(1994; C502a) Dry-Barrel Fire Hydrants
AWWA	C503	(1997) Wet-Barrel Fire Hydrants
AWWA	C504	(1994) Rubber-Seated Butterfly Valves
AWWA	C509	(1994) Resilient-Seated Gate Valves for Water Supply Service
AWWA	C600	(1993) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA	C606	(1997) Grooved and Shouldered Joints
AWWA	C651	(1992) Disinfecting Water Mains
AWWA	C700	(1995) Cold-Water Meters - Displacement Type, Bronze Main Case
AWWA	C701	(1988) Cold-Water Meters - Turbine Type, for Customer Service
AWWA	C702	(1992) Cold-Water Meters - Compound Type
AWWA	C703	(1996) Cold-Water Meters - Fire Service Type
AWWA	C704	(1992) Propeller-Type Meters Waterworks Applications
AWWA	C706	(1996) Direct-Reading, Remote-Registration Systems for Cold-Water Meters
AWWA	C707	(1982; R 1992) Encoder-Type Remote-Registration Systems for Cold-Water Meters
AWWA	C800	(1989) Underground Service Line Valves and

	as

AWWA C900 (1997; C900a Polyvinyl Chloride (PVC)

Pressure Pipe, 4 In. Through 12 In., for

Water Distribution

AWWA C901 (1996) Polyethylene (PE) Pressure Pipe and

Tubing, 1/2 In. Through 3 In., for Water

Service

AWWA C905 (1997) Polyvinyl Chloride (PVC) Water

Transmission Pipe, Nominal Diameters 14

In. Through 36 In.

AWWA C950 (1995) Fiberglass Pressure Pipe

AWWA M23 (1980) Manual: PVC Pipe - Design and

Installation

ASBESTOS CEMENT PIPE PRODUCERS ASSOCIATION (ACPPA)

ACPPA Work Practices (1988) Recommended Work Practices for A/C

Pipe

DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA)

DIPRA-Restraint Design (1997) Thrust Restraint Design for Ductile

Iron Pipe

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS

INDUSTRY (MSS)

MSS SP-80 (1997) Bronze Gate, Globe, Angle and Check

Valves

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 24 (1995) Installation of Private Fire

Service Mains and Their Appurtenances

NFPA 49 (1994) Hazardous Chemicals Data

NFPA 325-1 (1994) Fire Hazard Properties of Flammable

Liquids, Gases, and Volatile Solids

NFPA 704 (1996) Identification of the Fire Hazards

of Materials for Emergency Response

NFPA 1961 (1997) Fire Hose

NSF INTERNATIONAL (NSF)

NSF 14 (1998) Plastics Piping Components and

Related Materials

NSF 61 (1998) Drinking Water System Components - Health Effects (Sections 1-9)

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC Paint 21

(1991) White or Colored Silicone Alkyd
Paint

SSPC Paint 25

(1991) Red Iron Oxide, Zinc Oxide, Raw
Linseed Oil and Alkyd Primer (Without Lead
and Chromate Pigments)

1.2 PIPING

This section covers water service lines, and connections to building service at a point approximately 5 feet outside buildings and structures to which service is required and water lines for the water reservoir overflow pipeline. The Contractor shall have a copy of the manufacturer's recommendations for each material or procedure to be utilized available at the construction site at all times.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Waste Water Disposal Method; GA.

The method proposed for disposal of waste water from hydrostatic tests and disinfection, prior to performing hydrostatic tests.

Satisfactory Installation; FIO.

A statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

1.4 HANDLING

Pipe and accessories shall be handled to ensure delivery to the trench in sound, undamaged condition, including no injury to the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor in a satisfactory manner, at no additional cost to the Government. No other pipe or material shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly

cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

PART 2 PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

2.1.1 Service Lines

Piping for water service lines shall be copper tubing, unless otherwise shown or specified.

2.1.2 Excavation, Trenching, and Backfilling

Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, except as modified herein.

2.1.3 Plastic Pipe

2.1.3.1 PVC Plastic Pipe

- a. Pipe 4 through 12 inch diameter: Pipe couplings and fittings shall conform to AWWA C900, Class 150, CIOD pipe dimensions, elastomeric-gasket joint, unless otherwise shown or specified.
- b. Pipe 14 through 36 inch diameter: Pipe shall conform to AWWA C905 unless otherwise shown or specified.

2.1.4 Copper Tubing

Copper tubing shall conform to ASTM B 88, Type K, annealed.

2.1.5 Ductile-Iron Pipe

Ductile-iron pipe shall conform to AWWA C151, working pressure not less than 150 psi, unless otherwise shown or specified. Pipe shall be cement-mortar lined in accordance with AWWA C104. Linings shall be standard. When installed underground, pipe shall be encased with 8 mil thick polyethylene in accordance with AWWA C105. Flanged ductile iron pipe with threaded flanges shall be in accordance with AWWA C115.

2.2 FITTINGS AND SPECIALS

2.2.1 PVC Pipe System

For pipe 4 inch diameter and larger, fittings and specials shall be iron, bell end in accordance with AWWA C110, 150 psi pressure rating unless otherwise shown or specified, except that profile of bell may have special dimensions as required by the pipe manufacturer; or fittings and specials may be of the same material as the pipe with elastomeric gaskets, all in conformance with AWWA C900. Iron fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104. Fittings shall be bell and spigot or plain end pipe, or as applicable. Ductile iron compact fittings shall be in accordance with AWWA C153.

2.2.2 Copper Tubing System

Fittings and specials shall be flared and conform to ASME B16.26.

2.2.3 Ductile-Iron Pipe System

Fittings and specials shall be suitable for 150 psi pressure rating, unless otherwise specified. Fittings and specials for mechanical joint pipe shall conform to AWWA C110. Fittings and specials for use with push-on joint pipe shall conform to AWWA C110 and AWWA C111. Fittings and specials for grooved and shouldered end pipe shall conform to AWWA C606. Fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104. Ductile iron compact fittings shall conform to AWWA C153.

2.3 JOINTS

2.3.1 PVC Pipe

Joints, fittings, and couplings shall be as specified for PVC Pipe. Joints connecting pipe of differing materials shall be mechanical joints or as recommended by the manufacturer, subject to the approval of the Contracting Officer.

2.3.2 Copper Tubing Jointing

Joints shall be compression-pattern flared and shall be made with the specified fittings.

2.3.3 Ductile-Iron Pipe Jointing

- a. Mechanical joints shall be of the stuffing box type and shall conform to AWWA C111.
- b. Push-on joints shall conform to AWWA C111.
- c. Rubber gaskets and lubricants shall conform to the applicable requirements of AWWA C111.

2.4 VALVES

2.4.1 Gate Valves

Gate valves shall be designed for a working pressure of not less than 150

psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of the opening.

a. Valves 3 inches and larger shall be iron body, bronze mounted, and shall conform to AWWA C500. Flanges shall not be buried. An approved pit shall be provided for all flanged connections.

2.5 MISCELLANEOUS ITEMS

2.5.1 Service Clamps

Service clamps shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable-iron body with cadmium plated straps and nuts. Clamps shall have a rubber gasket cemented to the body.

2.5.2 Corporation Stops

Corporation stops shall have standard corporation stop thread conforming to AWWA C800 on the inlet end, with flanged joints, compression pattern flared tube couplings, or wiped joints for connections to goosenecks.

2.5.3 Goosenecks

Copper tubing for gooseneck connections shall conform to the applicable requirements of ASTM B 88, Type K, annealed. Length of cable requirement connections shall be in accordance with standard practice.

2.5.4 Service Stops

Service stops shall be water-works inverted-ground-key type, oval or round flow way, tee handle, without drain. Pipe connections shall be suitable for the type of service pipe used. All parts shall be of bronze with female iron-pipe-size connections or compression-pattern flared tube couplings, and shall be designed for a hydrostatic test pressure not less than 200 psi.

2.5.5 Tapping Sleeves

Tapping sleeves of the sizes indicated for connection to existing main shall be the cast gray, ductile, or malleable iron, split-sleeve type with flanged or grooved outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construction shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve. When using grooved mechanical tee, it shall consist of an upper housing with full locating collar for rigid positioning which engages a machine-cut hole in pipe, encasing an elastomeric gasket which conforms to the pipe outside diameter around the hole and a lower housing with positioning lugs, secured together during assembly by nuts and bolts as specified, pretorqued to 50 foot-pound.

2.5.6 Service Boxes

Service boxes shall be cast iron or concrete and shall be extension service boxes of the length required for the depth of the line, with either screw or slide-type adjustment. The boxes shall have housings of sufficient size to completely cover the service stop or valve and shall be complete with identifying covers.

2.5.7 Disinfection

Chlorinating materials shall conform to the following:

Chlorine, Liquid: AWWA B301.

Hypochlorite, Calcium and Sodium: AWWA B300.

2.5.8 Meters

Water meters for the rest rooms shall be purchased by the Contractor from the City of East Grand Forks Water and Light Department (218)773-1163.

2.6 VALVE BOXES

Valve boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subjected to vehicular traffic. Cast-iron boxes shall be extension type with slide-type adjustment and with flared base. The minimum thickness of metal shall be 3/16 inch. Concrete boxes shall be the standard product of a manufacturer of precast concrete equipment. The word "WATER" shall be cast in the cover. The box length shall adapt, without full extension, to the depth of cover required over the pipe at the valve location.

2.7 INSULATION

Insulation shall be rigid, extruded polystyrene board with minimum thermal resistance (R) of 5.0. Board size shall be 48-inch x 96-inch. Edges shall be square. Compressive strength shall be minimum 25 psi. Water absorption shall be maximum 0.1 percent in accordance with ASTM D 2842. Minimum thickness of individual boards shall be 1-inch.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Copper tubing shall be cut square and all burrs shall be

removed. Squeeze type mechanical cutters shall not be used for ductile iron.

3.1.2 Adjacent Facilities

3.1.2.1 Sewer Lines

Where the location of the water pipe is not clearly defined in dimensions on the drawings, the water pipe shall not be laid closer horizontally than 10 feet from a sewer except where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, in which case the water pipe shall not be laid closer horizontally than 6 feet from the sewer. Where water lines cross under gravity-flow sewer lines, the sewer pipe, for a distance of at least 10 feet each side of the crossing, shall be fully encased in concrete or shall be made of pressure pipe with no joint located within 3 feet horizontally of the crossing. Water lines shall in all cases cross above sewage force mains or inverted siphons and shall be not less than 2 feet above the sewer main. Joints in the sewer main, closer horizontally than 3 feet to the crossing, shall be encased in concrete.

3.1.2.2 Water Lines

Water lines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electric wiring.

3.1.2.3 Copper Tubing Lines

Copper tubing shall not be installed in the same trench with ferrous piping materials.

3.1.2.4 Nonferrous Metallic Pipe

Where nonferrous metallic pipe, e.g. copper tubing, crosses any ferrous piping material, a minimum vertical separation of 12 inches shall be maintained between pipes.

3.1.3 Joint Deflection

3.1.3.1 Offset for Flexible Plastic Pipe

The maximum offset in alignment between adjacent pipe joints shall be as recommend by the manufacturer and approved by the Contracting Officer but shall not exceed 5 degrees.

3.1.3.2 Allowable for Ductile-Iron Pipe

The maximum allowable deflection shall be as given in AWWA C600. If the alignment requires deflection in excess of the above limitations, special bends or a sufficient number of shorter lengths of pipe shall be provided to provide angular deflections within the limit set forth.

3.1.4 Placing and Laying

Pipe and accessories shall be carefully lowered into the trench by means of

derrick, ropes, belt slings, or other authorized equipment. Water-line materials shall not be dropped or dumped into the trench. Abrasion of the pipe coating shall be avoided. Except where necessary in making connections with other lines or as authorized by the Contracting Officer, pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joints are complete. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by and at the Contractor's expense in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored, as shown.

3.1.4.1 Piping Connections

Where connections are made between new work and existing mains, the connections shall be made by using mechanical joints and specials and fittings to suit the actual conditions. When made under pressure, these connections shall be installed using standard methods as approved by the Contracting Officer. Connections to existing asbestos-cement pipe shall be made in accordance with ACPPA Work Practices.

3.1.4.2 Plastic Pipe Installation

PVC pipe shall be installed in accordance wiht AWWA M23.

3.1.5 Jointing

3.1.5.1 PVC Plastic Pipe Requirements

- Pipe less than 4 inch diameter: Threaded joints shall be made by wrapping the male threads with approved thread tape or applying an approved lubricant, then threading the joining members together. The joint shall be tightened using strap wrenches to prevent damage to the pipe and/or fitting. To avoid excessive torque, joints shall be tightened no more than one thread past hand-tight. Preformed rubber-ring gaskets for elastomeric-gasket joints shall be made in accordance with ASTM F 477 and as specified. Pipe ends for push-on joints shall be beveled to facilitate assembly and marked to indicate when the pipe is fully seated. The gasket shall be prelubricated to prevent displacement. The gasket and ring groove in the bell or coupling shall match. The manufacturer of the pipe or fitting shall supply the elastomeric gasket. Couplings shall be provided with stops or centering rings to assure that the coupling is centered on the joint. Solvent cement joints shall use sockets conforming to ASTM D 2467. The solvent cement used shall be made in accordance with ASTM D 2564; the joint assembly shall be made in accordance with ASTM D 2855 and the manufacturer's specific recommendations.
- b. Pipe 4 through 12 inch diameter: Joints shall be elastomeric

gasket as specified in AWWA C900. Jointing procedure shall be as specified for pipe less than 4 inch diameter with configuration using elastomeric ring gasket.

3.1.5.2 Copper Tubing Requirements

Joints shall be made with flared fittings. The flared end tube shall be pulled tightly against the tapered part of the fitting by a nut which is part of the fitting, so there is metal-to-metal contact.

3.1.5.3 Ductile-Iron Pipe Requirements

Mechanical and push-on type joints shall be installed in accordance with AWWA C600 for buried lines.

3.1.6 Installation of Service Lines

Service lines shall include the pipeline connecting building piping to water distribution lines to the connections with the building service at a point approximately 5 feet outside the building where such building service exists. Where building services are not installed, the Contractor shall terminate the service lines approximately 5 feet from the site of the proposed building at a point designated by the Contracting Officer. Such service lines shall be closed with plugs or caps. All service stops and valves shall be provided with service boxes. Service lines shall be constructed in accordance with the following requirements:

3.1.6.1 Service Lines 2 Inches and Smaller

Service lines 2 inches and smaller shall be connected to the main by a directly-tapped corporation stop or by a service clamp. A corporation stop and a copper gooseneck shall be provided with either type of connection. Maximum sizes for directly-tapped corporation stops and for outlets with service clamps shall be as in TABLE I. Where 2 or more gooseneck connections to the main are required for an individual service, such connections shall be made with standard branch connections. The total clear area of the branches shall be at least equal to the clear area of the service which they are to supply.

TABLE I. SIZE OF CORPORATION STOPS AND OUTLET

Pipe Size Inches	Corporation Stops, Inches For Ductile-Iron Pipe	Outlets w/Service Clamps, Inches Single & Double Strap
3		1
4	1	1
6	1-1/4	1-1/2
8	1-1/2	2

TABLE	Τ.	SIZE	OF	CORPORATION	STOPS	AND	OUTLET

Pipe Size Inches	Corporation Stops, Inches	Outlets w/Service Clamps, Inches	
	For Ductile-Iron Pipe	Single & Double Strap	
10	1-1/2	2	
12 & larger	2	2	

NOTE:

- a. Service lines 1-1/2 inches and smaller shall have a service stop.
- b. Service lines 2 inches in size shall have a gate valve.

3.1.7 Setting of Meters and Valves

3.1.7.1 Location of Meters

Meters and meter boxes shall be installed at the locations shown on the drawings. The meters shall be centered in the boxes to allow for reading and ease of removal or maintenance.

3.1.7.2 Location of Valves

After delivery, valves shall be drained to prevent freezing and shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and valves shall be fully opened and fully closed to ensure that all parts are in working condition. Valves and valve boxes shall be installed where shown or specified, and shall be set plumb. Valve boxes shall be centered on the valves. Boxes shall be installed over each outside gate valve unless otherwise shown. Where feasible, valves shall be located outside the area of roads, streets, and sidewalks. Earth fill shall be tamped around each valve box or pit to a distance of 4 feet on all sides of the box, or the undisturbed trench face if less than 4 feet.

3.1.8 Thrust Restraint

Plugs, caps, tees and bends deflecting 11.25 degrees or more, either vertically or horizontally, on waterlines 4 inches in diameter or larger, shall be provided with thrust restraints. Valves shall be securely anchored or shall be provided with thrust restraints to prevent movement. Thrust restraints shall be thrust blocks.

3.1.8.1 Thrust Blocks

Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2,000 psi after 28 days. Blocking shall be placed between solid ground and the hydrant or fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of thrust blocks shall be

poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

3.1.8.2 Restrained Joints

For ductile-iron pipe, restrained joints shall be designed by the Contractor or the pipe manufacturer in accordance with DIPRA-Restraint Design.

3.1.9 Pipe Encasement

Steel pipe casing shall be installed around water pipe where shown. Steel pipe casing materials and installation shall be as specified in SECTION 02531: SANITARY SEWERS.

3.1.10 Insulation

Watermain shall be insulated as shown at all watermain offsets.

3.2 HYDROSTATIC TESTS

Where any section of a water line is provided with concrete thrust blocking for fittings or hydrants, the hydrostatic tests shall not be made until at least 5 days after installation of the concrete thrust blocking, unless otherwise approved.

3.2.1 Pressure Test

After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 200 psi. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, and valves shall be carefully examined during the partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. The requirement for the joints to remain exposed for the hydrostatic tests may be waived by the Contracting Officer when one or more of the following conditions is encountered:

- a. Wet or unstable soil conditions in the trench.
- b. Compliance would require maintaining barricades and walkways around and across an open trench in a heavily used area that would require continuous surveillance to assure safe conditions.
- c. Maintaining the trench in an open condition would delay completion

of the project.

The Contractor may request a waiver, setting forth in writing the reasons for the request and stating the alternative procedure proposed to comply with the required hydrostatic tests. Backfill placed prior to the tests shall be placed in accordance with the requirements of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.2.2 Leakage Test

Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and during the test the water line shall be subjected to not less than 200 psi pressure. Water supply lines designated on the drawings shall be subjected to a pressure equal to 200 psi. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure within 5 psi of the specified leakage test pressure after the pipe has been filled with water and the air expelled. Piping installation will not be accepted if leakage exceeds the allowable leakage which is determined by the following formula:

- L = 0.0001351ND(P raised to 0.5 power)
- L = Allowable leakage in gallons per hour
- N = Number of joints in the length of pipeline tested
- D = Nominal diameter of the pipe in inches
- P = Average test pressure during the leakage test, in psi gauge

Should any test of pipe disclose leakage greater than that calculated by the above formula, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the Government.

3.2.3 Time for Making Test

Except for joint material setting or where concrete thrust blocks necessitate a 5-day delay, pipelines jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill. Cement-mortar lined pipe may be filled with water as recommended by the manufacturer before being subjected to the pressure test and subsequent leakage test.

3.2.4 Concurrent Hydrostatic Tests

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be as specified. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

a. Pressure test and leakage test may be conducted concurrently.

b. Hydrostatic tests and disinfection may be conducted concurrently, using the water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be reaccomplished.

3.3 BACTERIAL DISINFECTION

3.3.1 Bacteriological Disinfection

Before acceptance of potable water operation, each unit of completed waterline shall be disinfected as prescribed by AWWA C651. After pressure tests have been made, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The chlorinating material shall be either liquid chlorine, calcium hypochlorite, or sodium hypochlorite, conforming to paragraph MISCELLANEOUS ITEMS. The chlorinating material shall provide a dosage of not less than 50 ppm and shall be introduced into the water lines in an approved manner. Polyvinyl chloride (PVC) pipelines shall be chlorinated using only the above specified chlorinating material in solution. The agent shall not be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. Personnel from the Contractor's commercial laboratory shall take at least 3 water samples on each line from different points, approved by the Contracting Officer, in proper sterilized containers and perform a bacterial examination in accordance with state approved methods. The commercial laboratory shall be certified by the state's approving authority for examination of potable water. The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

3.4 CLEANUP

Upon completion of the installation of water lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

-- End of Section --

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SECTION 02531

SANITARY SEWERS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198

Joints for Circular Concrete Sewer and
Culvert Pipe Using Flexible Watertight
Joints

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 240	(1997a) Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
ASTM C 94	(1998) Ready-Mixed Concrete
ASTM C 150	(1997) Portland Cement
ASTM C 270	(1997ael) Mortar for Unit Masonry
ASTM C 425	(1998) Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C 443	(1998) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 923	(1996) Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
ASTM C 972	(1995) Compression-Recovery of Tape Sealant

ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension		
ASTM D 624	(1991; R 1998) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers		
ASTM D 1784	(1999) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds		
ASTM D 2842	Test Method for Water Absorption of Rigid Cellular Plastics		
ASTM D 3034	(1998) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings		
ASTM D 3139	(1996a) Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals		
ASTM D 3212	(1996a) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals		
ASTM F 402	(1993) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings		
ASTM F 477	(1996a) Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe		
ASTM F 593	(1995) Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs		
ASTM F 594	Specification for Stainless Steel Nuts		
ASTM F 794	(1997) Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter		
ASTM F 949	(1996a) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings		
AMERICAN WATER WORKS ASSOCIATION (AWWA)			
AWWA C110	(1993) Ductile-Iron and Gray-Iron fittigs, 3 in. through 48 in. for Water and Other Liquids		
AWWA C111	(1995) Rubber-Gasket Joints for		

Ductile-Iron Pressure Pipe and Fittings

AWWA C151 (1996) Ductile-Iron Pipe, Centrifugally

Cast, for Water or Other Liquids

AWWA C500 (1993; C500a) Metal-Sealed Gate Valves for

Water Supply Service

AWWA C900 (1989; C900a) Polyvinyl Chloride (PVC)

Pressure Pipe, 4 In. through 12 In., for

Water Distribution

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 49 (1994) Hazardous Chemicals Data

NFPA 325-1 (1994) Fire Hazard Properties of Flammable

Liquids, Gases, and Volatile Solids

NFPA 704 (1996) Identification of the Fire Hazards

of Materials for Emergency Response

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-6 (1990) Recommended Practice for the

Low-Pressure Air Testing of Installed

Sewer Pipe

UBPPA UNI-B-9 (1990; Addenda 1994) Recommended

Performance Specification for Polyvinyl Chloride (PVC) Profile Wall Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter (Nominal Pipe Sizes 4-48

inch)

1.2 GENERAL REQUIREMENTS

The construction required herein shall include appurtenant structures and building sewers to points of connection with the building drains 5 feet outside the building to which the sewer system is to be connected. The Contractor shall replace damaged material and redo unacceptable work at no additional cost to the Government. Excavation and backfilling is specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer. Force mains are specified in Section 02532: FORCE MAINS.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-13 Certificates

Portland Cement; GA.

Certificates of compliance stating the type of cement used in manufacture of concrete pipe, fittings and precast manholes.

PART 2 PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

2.1.1 Plastic Pipe

2.1.1.1 PVC Pipe

PVC pipe and fittings: AWWA C900, Class 150 with push-on joints.

2.1.1.2 Ductile Iron Pipe

- a. Ductile Iron Pipe: AWWA C151, working pressure not less than 150 psi.
- b. Fittings, Mechanical: AWWA C110, rated for 150 psi.

2.2 REQUIREMENTS FOR FITTINGS

Fittings shall be compatible with the pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and other requirements specified below.

2.3 JOINTS

Joints connecting pipe of differing materials shall be mechanical joint or as recommended by the manufacturer subject to the approval of the Contracting Officer.

2.3.1 Plastic Pipe Jointing

Push on joints: ASTM D 3139, with ASTM F 477 gaskets.

2.3.2 Ductile Iron Pipe

Mechanical joints: AWWA C111 as modified by AWWA C151.

2.4 BRANCH CONNECTIONS

Branch connections shall be made by use of regular fittings or solvent cemented saddles as approved. Saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

2.5 FRAMES AND COVERS

Frames and covers shall be cast iron or ductile iron. Cast iron frames and covers shall be as indicated or shall be of type suitable for the application, circular, without vent holes. The frames and covers shall have a combined weight of not less than 400 pounds. The word "Sewer" shall be stamped or cast into covers so that it is plainly visible. All covers and frames shall be capable of withstanding and HS20 wheel load.

2.6 STEEL LADDER

A steel ladder shall be provided where the depth of a manhole is 12 feet or greater. Ladders shall be as shown. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

2.7 MANHOLE STEPS

Manhole steps shall be provided for manholes less than 12 feet in depth. Manhole steps shall be a minimum of 12 inches wide with rungs spaced 12 inches apart. Manhole steps shall be cast aluminum or polypropylene-coated steel.

2.8 CEMENT MORTAR

Cement mortar shall conform to ASTM C 270, Type M with Type II cement.

2.8.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type II for concrete in manholes.

2.8.2 Portland Cement Concrete

Portland cement concrete shall conform to ASTM C 94, compressive strength of 4000 psi at 28 days. Concrete in place shall be protected from freezing and moisture loss for 7 days.

2.9 STRUCTURES

2.9.1 Precast Reinforced Concrete Manhole Sections

Precast reinforced concrete manhole sections shall conform to ASTM C 478, except that portland cement shall be as specified herein. Joints between sections shall be flexible watertight joints.

2.9.2 Flexible Watertight Joints

Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443. Factory-fabricated resilient joint materials shall conform to ASTM C 425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the

nominal diameter of the pipe being gasketed exceeds 54 inches.

2.9.3 Chimney Seal

The manhole frame and chimney joint area of sanitary sewer manhole structures shall be sealed with an external flexible rubber seal as shown. The chimney seal shall consist of an external flexible rubber seal and compression bands.

2.9.3.1 External Rubber Seal

The flexible rubber sleeve and extension shall be extruded from a high grade rubber compound conforming to the applicable requirements of ASTM C 923, with a minimum 1,500 psi tensile strength, maximum 18% compression set and a hardness (durometer) of 48 + 5.

The sleeve shall be corrugated, with a minimum thickness of 3/16 inches and shall be available in unexpanded vertical heights of 6 and 9 inches, each capable of a vertical expansion of not less than 2 inches when installed. The top section of the sleeve shall contain multiple sealing fins and be designed to extend both over and under the manhole base flange, thereby allowing it to be mechanically locked in place. The bottom section of the sleeve shall contain an integrally formed compression band recess and multiple sealing fins.

The extension shall have a minimum thickness of 3/16 inches. The top portion of the extension shall be shaped to fit into the bottom band recess of the sleeve and have its own integrally formed band recess, which is located such that when assembled the recess is centered over that of the sleeve. The bottom section of the extension shall contain an integrally formed compression band recess and multiple sealing fins.

Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180 degree bend with no visible separation.

2.9.3.2 Compression Bands

Expansion bands used to compress the rubber seal against the manhole frame shall be minimum 16 gauge stainless steel conforming to ASTM A 240, Type 304, with a minimum width of 1 inch. The top compression band shall have a shape and width sufficient to mechanically lock the sleeve and frame together, when tightened.

The tightening mechanism on both bands shall have the capacity to develop the pressures necessary to make a watertight seal and shall have a minimum adjustment range of 2 diameter inches. Screws, bolts, nuts, and other hardware used on the bands shall be stainless steel conforming to ASTM F 593 and ASTM F 594, Type 304.

2.10 Casing Pipe

Casing pipe shall be welded steel pipe, new material, with a minimum yield of 35,000 psi. The minimum wall thickness shall be 0.250 inches for casing

pipe with outside diameter 24" or less, shall be 0.375 inches for casing pipe with outside diameter greater than 24" and less than or equal to 30", and shall be 0.5 inches for casing pipe 36" in diameter or larger. A minimum clearance of at least 2 inches between the inner wall of the casing pipe and the maximum outside diameter of the cased pipe and joints shall be provided. Sand shall be placed in the void between the inner wall of the casing pipe and the cased pipe. A minimum of 1 foot of grout shall be placed in the void between the inner wall of the casing pipe and the cased pipe at the ends of the casing pipe after placement of sand. Steel casing pipe shall be encased in polyethylene as specified in Paragraph: PE Pipe Encasement.

2.11 VALVES

2.11.1 Gate Valves

Gate valves shall be designed for a working pressure of not less than 150 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of the opening.

a. Valves 3 inches and larger shall be iron body, bronze mounted, and shall conform to AWWA C500. Flanges shall not be buried. An approved pit shall be provided for all flanged connections.

2.12 INSULATION

Insulation shall be rigid, extruded polystyrene board with minimum thermal resistance (R) of 5.0. Board size shall be 48-inch x 96-inch. Edges shall be square. Compressive strength shall be minimum 25 psi. Water absorption shall be maximum 0.1 percent in accordance with ASTM D 2842. Minimum thickness of individual boards shall be 1-inch.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Adjacent Facilities

3.1.1.1 Water Lines

Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be closer horizontally than 10 feet to a water-supply main or service line, except that where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, the horizontal spacing may be a minimum of 6 feet. Where gravity-flow sewers cross above water lines, the sewer pipe for a distance of 10 feet on each side of the crossing shall be fully encased in concrete or shall be acceptable pressure pipe with no joint closer horizontally than 3 feet to the crossing. The thickness of the concrete encasement including that at the pipe joints shall be not less than 4 inches.

3.1.1.2 Structural Foundations

Where sewer pipe is to be installed within 3 feet of an existing or proposed building or structural foundation, the sewer pipe shall be sleeved as specified above. A minimum clearance of at least 2 inches between the inner wall of the sleeve and the maximum outside diameter of the sleeved pipe and joints shall be provided. Sand bedding shall placed between the pipe and sleeve. Contractor shall ensure there is no damage to these structures, and no settlement or movement of foundations or footing.

3.1.2 Pipe Laying

- a. Pipe shall be protected during handling against impact shocks and free fall; the pipe interior shall be free of extraneous material.
- b. Pipe laying shall proceed upgrade with the spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Each pipe shall be laid accurately to the line and grade shown on the drawings. Pipe shall be laid and centered so that the sewer has a uniform invert. As the work progresses, the interior of the sewer shall be cleared of all superfluous materials.
- c. Before making pipe joints, all surfaces of the portions of the pipe to be joined shall be clean and dry. Lubricants, primers, and adhesives shall be used as recommended by the pipe manufacturer. The joints shall then be placed, fitted, joined, and adjusted to obtain the degree of water tightness required.
- d. Installations of solvent weld joint pipe, using PVC pipe and fittings shall be in accordance with ASTM F 402. The Contractor shall ensure adequate trench ventilation and protection for workers installing the pipe.

3.1.2.1 Trenches

Trenches shall be kept free of water and as dry as possible during bedding, laying, and jointing and for as long a period as required. When work is not in progress, open ends of pipe and fittings shall be satisfactorily closed so that no trench water or other material will enter the pipe or fittings.

3.1.2.2 Backfill

As soon as possible after the joint is made, sufficient backfill material shall be placed along the pipe to prevent pipe movement off line or grade. Plastic pipe shall be completely covered to prevent damage from ultraviolet light.

3.1.2.3 Width of Trench

If the width of the trench at the top of the pipe exceeds that shown for any reason other than by direction, the Contractor shall install, at no

additional cost to the Government, concrete cradling, pipe encasement, or other bedding required to support the added load of the backfill.

3.1.2.4 Jointing

Joints between different pipe materials shall be made as specified, using approved jointing materials.

3.1.2.5 Handling and Storage

Pipe, fittings and joint material shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities for plastic pipe, fittings, joint materials and solvents shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325-1.

3.1.3 Casing Pipe

Steel casing pipe shall be provided for sanitary sewers shown.

3.1.4 PE Pipe Encasement

Steel and ductile iron pipe and casing pipe shall be encased with 8 mil thick polyethylene in accordance with AWWA C105.

3.1.5 Leakage Tests

Sanitary sewer mains shall be tested for leakage by low pressure air testing, infiltration tests or exfiltration tests, as appropriate. Low pressure air testing for PVC pipe shall be as prescribed in UBPPA UNI-B-6. Prior to infiltration or exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. When the Contracting Officer determines that infiltration cannot be properly tested, an exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be re-established. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by either the infiltration test or exfiltration test shall not exceed 25 gal per inch diameter per mile of pipeline per day. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correction, and retesting shall be made at no additional cost to the Government.

3.1.6 Test for Deflection

When flexible pipe is used, a deflection test shall be made on the entire length of the installed pipeline not less than 30 days after the completion of all work including the leakage test, backfill, and placement of any fill, grading, paving, concrete, or superimposed loads. Deflection shall be determined by use of a deflection device or by use of a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft. The ball, cylinder, or circular sections shall have a diameter, or minor diameter as applicable, of 92.5 percent of the inside diameter of the pipe. A tolerance of plus 0.5 percent will be permitted. The ball, cylinder, or circular sections shall be of a homogeneous material throughout, shall have a density greater than 1.0 as related to water at 39.2 degrees F, and shall have a surface brinell hardness of not less than 150. The device shall be center bored and through bolted with a 1/4 inch minimum diameter steel shaft having a yield strength of 70,000 psi or more, with eyes at each end for attaching pulling cables. The eye shall be suitably backed with flange or heavy washer; a pull exerted on the opposite end of the shaft shall produce compression throughout the remote end of the ball, cylinder or circular section. Circular sections shall be spaced so that the distance from the external faces of the front and back sections shall equal or exceed the diameter of the circular section. Failure of the ball, cylinder, or circular section to pass freely through a pipe run, either by being pulled through or by being flushed through with water, shall be cause for rejection of that run. When a deflection device is used for the test in lieu of the ball, cylinder, or circular sections described, such device shall be approved prior to use. The device shall be sensitive to 1.0 percent of the diameter of the pipe being measured and shall be accurate to 1.0 percent of the indicated dimension. Installed pipe showing deflections greater than 7.5 percent of the normal diameter of the pipe shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.2 INSTALLATION OF WYE BRANCHES

Wye branches shall be installed where sewer connections are indicated or where directed. Cutting into piping for connections shall not be done except in special approved cases. When the connecting pipe cannot be adequately supported on undisturbed earth or tamped backfill, the pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence by the Contractor shall be installed at no additional cost to the Government. The installation of wye branches in an existing sewer shall be made by a method which does not damage the integrity of the existing sewer. One acceptable method consists of removing one pipe section, breaking off the upper half of the bell of the next lower section and half of the running bell of wye section. After placing the new section, it shall be rotated so that the broken half of the bell will be at the bottom. The two joints shall then be made with joint packing and cement mortar.

3.3 MANHOLE DETAILS

3.3.1 General Requirements

Manholes shall be constructed of precast concrete manhole sections. The

invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Changes in size and grade of the channels shall be made gradually and evenly. The invert channels shall be formed directly in the concrete of the manhole base, or shall be built up with brick and mortar, or shall be half tile laid in concrete, or shall be constructed by laying full section sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. Pipe connections shall be made to manhole using water stops, standard O-ring joints, special manhole coupling, or shall be made in accordance with the manufacturer's recommendation. The Contractor's proposed method of connection, list of materials selected, and specials required, shall be approved prior to installation. The floor of the manhole outside the channels shall be smooth and shall slope toward the channels not less than 1 inch per foot nor more than 2 inches per foot. Free drop inside the manholes shall not exceed 18 inches, measured from the invert of the inlet pipe to the top of the floor of the manhole outside the channels; drop manholes shall be constructed whenever the free drop would otherwise be greater than 1 foot 6 inches.

3.3.2 Steel Ladder Anchorage

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet apart vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

3.3.3 Jointing, Plastering and Sealing

Mortar joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of the manhole. Mortar and mastic joints between precast rings shall be full-bedded in jointing compound and shall be smoothed to a uniform surface on both the interior and exterior of the manhole. Installation of rubber gasket joints between precast rings shall be in accordance with the recommendations of the manufacturer. Precast rings may also be sealed by the use of extruded rolls of rubber with mastic adhesive on one side.

3.3.4 Setting of Frames and Covers

Unless otherwise indicated, tops of frames and covers shall be set flush with finished grade in paved areas or 2 inches higher than finished grade in unpaved areas. Frame and cover assemblies shall be sealed to manhole sections using external preformed rubber joint seals that meet the requirements of ASTM D 412 and ASTM D 624, or other methods specified in paragraph Jointing, Plastering and Sealing, unless otherwise specified.

3.3.5 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be

affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If while the joint is being made the gasket becomes visibly dislocated, the pipe shall be removed and the joint remade.

3.4 CONNECTING TO EXISTING MANHOLES

Pipe connections to existing manholes shall be made so that finish work will conform as nearly as practicable to the applicable requirements specified for new manholes, including all necessary concrete work, cutting, and shaping. The connection shall be centered on the manhole. Holes for the new pipe shall be of sufficient diameter to allow packing cement mortar around the entire periphery of the pipe but no larger than 1.5 times the diameter of the pipe. Cutting the manhole shall be done in a manner that will cause the least damage to the walls.

3.5 BUILDING CONNECTIONS

Building connections shall include the lines to and connection with the building waste drainage piping at a point approximately 5 feet outside the building, unless otherwise indicated. Where building drain piping is not installed, the Contractor shall terminate the building connections approximately 5 feet from the site of the building at a point and in a manner designated.

3.6 CLEANOUTS AND OTHER APPURTENANCES

Cleanouts and other appurtenances shall be installed where shown on the drawings or as directed by the Contracting Officer, and shall conform to the detail of the drawings.

3.7 VALVES

Gate valves shall be installed where valves are indicated.

3.8 INSULATION

Insulation shall be installed where shown. Joints of insulation shall be staggered.

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06/02

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SECTION 02630

STORM-DRAINAGE SYSTEM 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 346/346R (1990) Standard Specification for

Cast-in-Place Nonreinforced Concrete Pipe

and Recommendations

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

(AASHTO)

AASHTO HB-16 (1996) Standard Specifications for Highway

Bridges

AASHTO M 198 (1998) Joints for Circular Concrete Sewer

and Culvert Pipe Using Flexible Watertight

Gaskets

AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION

(AREMA)

AREMA Manual (1999) Manual for Railway Engineering (4

Vol.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 48 (1994a) Specification for Gray Iron

Castings

ASTM A 123 (1997ael) Zinc (Hot-Dip Galvanized)

Coatings on Iron and Steel Products

ASTM A 536 (1993) Specification for Ductile Iron

Castings

ASTM A 760 (1997) Corrugated Steel Pipe,

Metallic-Coated for Sewers and Drains

ASTM A 798	(1997a) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
ASTM A 929	(1997) Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe
ASTM B 26	(1997) Specification for Aluminum-Alloy Sand Castings
ASTM C 14	(1999) Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C 76	(1999) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method Clay Pipe and Fittings
ASTM C 270	(1995a) Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM C 425	(1997) Specification for Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C 443	(1998) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 789	(1998) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
ASTM C 850	(1998) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 Ft. of Cover Subjected to Highway Loadings
ASTM C 923	(1998) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Materials
ASTM C 924	(1998) Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM C 1103	(1994) Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines Sponge or Expanded Rubber

ASTM D 1171	(1994) Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2842	Test Method for Water Absorption of Rigid Plastics
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Access to 2nd Street NE; GA

A plan and schedule for installing the storm drainage facilities on 2nd Street NE while maintaining continuous access shall be submitted for review.

Access to 2nd Avenue NE (Murray Bridge); GA

A plan and schedule for installing the storm drainage facilities on 2nd Street NE and 2nd Avenue NE while maintaining continuous access shall be submitted for review.

Jacking Plan of Operations; GA

A plan of operations for the installing the required segments of piping by jacking techniques shall be submitted.

SD-09 Reports

Test Reports; FIO

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed.

SD-13 Certificates

Frame and Cover; FIO.

Certification on the ability of frame and cover to carry the imposed live load.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

ASTM C 76, Class as indicated on the Drawings.

2.1.1.1 Pipe Through Levees

Concrete pipe outlets through the levees, from the pump stations and gatewells, shall be constructed of pipe sections a maximum of 4 feet in length.

2.1.2 Corrugated Steel Pipe

ASTM A 760, zinc or aluminum (Type 2) coated pipe of either:

- a. Type I pipe with annular or helical 2-2/3 by 1/2 inch corrugations.
- b. Type IR pipe with helical 3/4 by 3/4 by 7-1/2 inch corrugations.

2.2 DRAINAGE STRUCTURES

2.2.1 Grated Steel Pipe Flared End Sections

Sections shall be of a standard design fabricated from zinc coated steel sheets meeting requirements of ASTM A 929.

2.2.2 Precast Concrete Flared End Sections

Sections shall be of a standard design in accordance with ASTM C 76, Class II. Steel trash racks shall be provided for concrete flared end sections where indicated. Trash racks shall be in accordance with SECTION 05055: METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Concrete

Concrete for junction manholes, gatewells, and pump stations shall conform to the requirements of SECTION 03300 CAST-IN-PLACE-STRUCTRUAL CONCRETE.

2.3.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.3.3 Precast Reinforced Concrete Manholes

Precast reinforced concrete manholes shall conform to ASTM C 478. Joints between precast concrete sections shall be made with flexible watertight, rubber-type gaskets meeting the requirements of paragraph JOINTS.

2.3.4 Frame and Cover

Frame and cover shall be cast gray iron, ASTM A 48, Class 35B; cast ductile iron, ASTM A 536, Grade 65-45-12; or cast aluminum, ASTM B 26, Alloy 356.OT6. Frame and cover model for grates and curb inlets shall be as indicated on the Drawings. All castings and frames shall be capable of withstanding a HS20 wheel load.

2.3.5 Joints

2.3.5 Flexible Watertight Joints

a. Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443. Factory-fabricated resilient joint materials shall conform to ASTM C 425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe or manhole being gasketed exceeds 54 inches.

2.3.6 Separation Geotextile

Separation geotextile shall be as specified in SECTION 02373: SEPARATION GEOTEXTILE.

2.4 STEEL LADDER

2.4.1 Cast-In-Place Concrete Structures

Steel ladders shall be provided for cast-in-place concrete structures, including pump stations and gatewells, as shown. Ladders shall not be placed in junction manholes. Ladders shall be in accordance with SECTION 05055: METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

2.4.2 Precast Concrete Manholes

Steel ladders shall be provided for precast manholes between 12-feet in depth and 20-feet in depth. Ladders shall be as shown. Ladders shall be in accordance with SECTION 05055: METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

Manhole steps shall be provided for manholes less than 12-feet in depth. Manhole steps shall be a minimum of 12-inches wide with rungs spaced 12-inches apart. Manhole steps shall be cast aluminum or polypropylene-coated steel.

Ladders or manhole steps shall not be provided in manholes greater than 20 feet in depth.

2.5 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C 923.

2.6 INSULATION

Insulation shall be rigid, extruded polystyrene board with minimum thermal resistance (R) of 5.0. Board size shall be 48-inch x 96-inch or equal to size of the structure base slab. Edges shall be square. Compressive strength shall be minimum 25 psi. Water absorption shall be maximum 0.1 percent in accordance with ASTM D 2842. Minimum thickness of individual boards shall be 1-inch.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

3.1.1 Earthwork

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of SECTION 02316: "EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITY SYSTEMS" and SECTION 02300: "EARTHWORK" and the requirements specified below. Excavation and backfill for junction manholes, pump stations, and gatewell structures shall be in accordance with SECTION 02315: EXCAVATION, FILLING AND BACKFILLING FOR STRUCTURES.

3.1.2 Installation, General

Storm drainage piping and other facilites shall be installed by trenching techniques except for the segments where installation by jacking techniques is shown.

- a. The Contractor shall install the 24" RCP culvert across the BNSF railroad tracks in Reach 1 at approximately D245+00 concurrently with the adjacent stoplog closure structure as specified in SECTION 01000: GENERAL. The culvert shall be installed by trenching techniques unless otherwise approved by the Contracting Officer.
- b. The contractor shall take extreme precautions during installation of storm sewer in the vicinity of Station D168+00 to D170+00 in Reach 1. There are eight (8) water line gate valves in the area and water lines that discharge from the water plant that serve the entire City of East Grand Forks. The Contractor shall protect the valves and water lines from damage. The Contractor shall contact and coordinate with the Water Treatment Plant Superintendent in advance of working in this area.

3.1.3 Access to Streets

3.1.3.1 Access to 2nd Street NE

Interruption of 2nd Street NE between approximate Station D150+00 to D193+00 in Reach 1 for installation of storm sewer piping will not be allowed. Continuous access to the businesses and facilities along 2nd Street NE shall be maintained. The storm drainage facility work shall be staged as required to provide continuous access. A plan and schedule for installing the storm drainage facilities on 2nd Street NE while maintaining continuous access shall be submitted for review.

3.1.3.2 Access to 2nd Avenue NE

Continuous access shall be provided on 2nd Avenue NE to the Murray Bridge during storm sewer facility construction as specified in SECTION 01000: GENERAL.

3.1.4 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 36 inches to permit satisfactory jointing and thorough tamping of the bedding material under

and around the pipe. Sheeting and bracing, where required, shall be placed within the trench width as specified. Contractor shall not overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.5 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with satisfactory material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.2.2 Corrugated Metal Pipe

Bedding for corrugated metal pipe and pipe arch shall be in accordance with ASTM A 798. It is not required to shape the bedding to the pipe geometry.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipe shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed the following limits:

MAXIMUM ALLOWABLE DEFLECTION (%)

TYPE OF PIPE

Corrugated Steel

5

Not less than 30 days after the completion of backfilling, the Government may perform a deflection test on the entire length of installed flexible pipe using a mandrel or other suitable device. Installed flexible pipe showing deflections greater than those indicated above shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.3.1 Concrete Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Corrugated Metal Pipe

Laying shall be with the separate sections joined firmly together, with the outside laps of circumferential joints pointing upstream, and with longitudinal laps on the sides.

3.3.3 Jacking Pipe Through Fills

Methods of operation and installation for jacking pipe through fills shall conform to requirements specified in Volume 1, Chapter 1, Part 4 of AREMA Manual. Jacked pipe 36-inches inside diameter or smaller shall be installed in a casing pipe. A casing pipe is not required for jacking pipe greater than 36-inches inside diameter. The casing pipe shall be welded steel pipe, new material, with a minimum yield of 35,000 psi. The minimum wall thickness shall be 0.250 inches for casing pipe with outside diameter 24" or less, shall be 0.375 inches for casing pipe with outside diameter greater than 24" and less than or equal to 30" and shall be 0.5 inches for casing pipe 36" in diameter or larger. A minimum clearance of at least 2 inches between the inner wall of the casing pipe and the maximum outside diameter of the cased pipe and joints shall be provided. The void between the casing pipe and the cased pipe shall be filled with sand. A minimum of 1 foot of grout shall be placed in the void between the inner wall of the casing pipe and the cased pipe at the ends of the casing pipe after placement of sand.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe,

and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.4.2 Corrugated Metal Pipe

3.4.2.1 Field Joints

Transverse field joints shall be designed so that the successive connection of pipe sections will form a continuous line free of appreciable irregularities in the flow line. In addition, the joints shall meet the general performance requirements described in ASTM A 798. Suitable transverse field joints which satisfy the requirements for one or more of the joint performance categories can be obtained with the following types of connecting bands furnished with suitable band-end fastening devices: corrugated bands, bands with projections, flat bands, and bands of special design that engage factory reformed ends of corrugated pipe. The space between the pipe and connecting bands shall be kept free from dirt and grit so that corrugations fit snugly. The connecting band, while being tightened, shall be tapped with a soft-head mallet of wood, rubber or plastic, to take up slack and ensure a tight joint. Field joints for each type of corrugated metal pipe shall maintain pipe alignment during construction and prevent infiltration of fill material during the life of the installations. The type, size, and sheet thickness of the band and the size of angles or lugs and bolts shall be as indicated or where not indicated, shall be as specified in the applicable standards or specifications for the pipe.

3.4.2.2 Flexible Watertight, Gasketed Joints

Installation shall be as recommended by the gasket manufacturer for use of lubricants and cements and other special installation requirements. The gasket shall be placed over one end of a section of pipe for half the width of the gasket. The other half shall be doubled over the end of the same pipe. When the adjoining section of pipe is in place, the doubled-over half of the gasket shall then be rolled over the adjoining section. Any unevenness in overlap shall be corrected so that the gasket covers the end of pipe sections equally. Connecting bands shall be centered over adjoining sections of pipe, and rods or bolts placed in position and nuts tightened. Band Tightening: The band shall be tightened evenly, even tension being kept on the rods or bolts, and the gasket; the gasket shall seat properly in the corrugations. Watertight joints shall remain uncovered for a period of time designated, and before being covered, tightness of the nuts shall be measured with a torque wrench. If the nut has tended to loosen its grip on the bolts or rods, the nut shall be retightened with a torque wrench and remain uncovered until a tight, permanent joint is assured.

3.5 GEOTEXTILE WRAP

Storm drainage piping installed in the levee embankment shall be wrapped in separation geotextile as shown.

3.6 DRAINAGE STRUCTURES

3.6.1 Manholes

Construction shall be of precast reinforced concrete with flexible watertight joints, complete with frames and covers or grates, and with fixed galvanized steel ladders or manhole steps.

3.6.2 Cast-In-Place Structures

Construction shall be in accordance with SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE.

3.7 STEEL LADDER AND MANHOLE STEPS INSTALLATION

Steel ladder shall be installed as shown. Manhole steps shall be adequately anchored to the wall by means of steel inserts.

3.8 MOVEMENT OF CONSTRUCTION MACHINERY

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be replace and joints repaired.

3.9 INSULATION

Insulation shall be installed where shown and to the thickness shown. Joints, if necessary, shall be staggered.

-- End of Section --

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AGGREGATE BASE OR SURFACE COURSE

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SECTION 02722

AGGREGATE BASE OR SURFACE COURSE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996) Sieve analysis of fine and coarse aggregates
ASTM D 75	(1997) Sampling Aggregates
ASTM D 422	(1963;R 1990) Particle-Size Analysis of Soils
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/CF)
ASTM D 1241	(1994) Materials for soil aggregate subbase, base, and surface courses
ASTM D 2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1995a) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 2112	Subgrade Preparation
MNDOT 2211	Aggregate Base
MNDOT 3138	Aggregates for Surface and Base Courses

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Material Sources; GA

Subballast source including material test outlining material gradation and percentage of material with one fractured face. Provide sources of other proposed aggregates with material gradations.

SD-09 Reports

Testing; FIO

A summary of sampling and testing results indicated in PARAGRAPH: TESTING shall be submitted when the road work is substantially complete.

PART 2 PRODUCTS

2.1 REQUIREMENTS

All products shall meet the requirements of the specified sections of the MNDOT Standard Specifications, except where modified or required below. Aggregate gradations, as indicated by class, for aggregate base course and surface course specified in the MNDOT Standard Specifications shall be strictly adhered to.

2.2 MATERIALS

2.2.1 Aggregate Base Course

Aggregate base course shall consist of crushed concrete unless otherwise noted or required for reconstructed street sections. Crushed concrete shall consist of previously hardened portland cement concrete or other concrete containing pozzolanic binder material. The crushed concrete shall be free of all reinforcing steel, wire mesh, bituminous concrete, and any other foreign material. Crush and process the concrete to meet the required gradations as identified by class and all other requirements of MNDOT 2211 and MNDOT 3138, except the maximum particle size allowed for crushed concrete is 1-1/2 inches. Replace base course of reconstructed street sections in kind meeting MNDOT 2211 and MNDOT 3138.

2.2.2 Aggregate Surfacing Course

Aggregate surfacing course shall consist of crushed gravel graded to the class shown and meeting the requirements of MNDOT 3138.

2.2.3 Aggregate Subballast

Aggregate subballast shall be crushed rock meeting the requirements of ASTM D 1241 with a minimum 75% of the material having one fractured face. The subballast shall meet the following gradation:

Sieve Size	Percent Passing
1-1/2"	95 - 100
3/4"	80 - 95
1/2"	60 - 80
No. 4	25 - 60
No. 10	20 - 50
No. 100	8 - 18
No. 200	5 - 15

PART 3 EXECUTION

3.1 GENERAL

Furnishing, placing, compaction, subgrade preparation, and testing shall meet the requirements of the MNDOT 2112, MNDOT 2211, and MNDOT 3138. Compaction shall be in accordance with the specified density method.

3.2 TESTING

3.2.1 General

All testing expenses shall be the Contractor's responsibility. Prior to sampling and testing the work, testing laboratories shall be inspected and approved in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL.

3.2.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction or corrective action required. Draft copies of field testing results shall be submitted to the Contracting Officer within 24 hours of the test, as directed.

3.2.3 Corrective Action

Tests of materials which do not meet the contract requirements (failing tests) will not be counted as part of the required testing. Each such failing test must be retaken at the same location as the failing test was taken. If testing indicates material does not meet the contract requirements, the material represented by the failing test shall be removed. The quantity of material represented by the failing test shall be determined by the Contracting Officer up to the quantity represented by the testing frequency. The Contractor may increase testing frequency in the

vicinity of a failing test in order to reduce removal requirements, as approved by the Contracting Officer. Such increases in testing frequency shall be at the Contractor's expense and at no additional cost to the Government.

3.2.4 Sampling

Sampling shall be done in accordance with ASTM D 75. Properties shall be determined from three random samples taken from the stockpile from each lot of 5,000 tons or fraction thereof at the source prior to delivery to the site.

3.2.5 Liquid Limit and Plasticity Index

Liquid Limit and Plasticity Index shall be tested in accordance with ASTM D 4318, respectively. The portion of the material passing the No. 40 sieve must have a liquid limit not greater than 25 and a plasticity index not greater than 5.

3.2.6 LA Abrasion

LA Abrasion shall be tested in accordance with ASTM C 131. Results must meet the requirements of the MNDOT 3138.

3.2.7 Sieve Analysis

3.2.7.1 Aggregate Base or Surface Course

Sieve Analysis on aggregate base or surface course shall be made in conformance with ASTM D 422. Satisfactory results are specified in MNDOT 3138.

3.2.7.2 Subballast

Sieve analysis on subballast shall be made in accordance with ASTM C 136. Tests on subballast shall include the percentage of material with one fractured face.

3.2.8 Moisture Density Determination

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 698.

3.2.9 Field Density and Water Content

In-place density shall be field verified in accordance with ASTM D 2922. Water content shall be maintained during the compaction procedure to within plus or minus 3 percent of the optimum water content. Compaction shall continue until each layer has a degree of compaction that is at least 100 percent of the laboratory maximum density through the full depth of the layer. Testing shall occur at random intervals on every 2,000 tons of aggregate base or surface course installed or fraction thereof.

3.2.10 Subgrade Tolerances

Tolerances are provided in MNDOT 2211.

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PLANT-MIXED BITUMINOUS PAVEMENT

06/02

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SECTION 02741

PLANT-MIXED BITUMINOUS PAVEMENT 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 117	(1995) Test Method for Material Finer Than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	(1996a) Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D 2172	(1995) Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) STANDARD SPECIFICATIONS FOR CONSTRUCTION (1995 EDITION WITH SUPPLEMENTS)

MNDOT 2331	Plant Mixed Bituminous Pavement
MNDOT 2340	Plant-Mixed Bituminous Pavement Quality Control/Quality Assurance
MNDOT 2357	Bituminous Tack Coat
MNDOT 3139	Graded Aggregate for Bituminous Mixtures

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-07 Schedules

Paving Schedule; FIO

Submit paving schedule at least 7 days prior to start of paving.

SD-09 Reports

Testing; FIO.

The Contractor shall submit complete records of all quality control test and inspections. All test results and calculations will be recorded and documented on data sheets approved by the Contracting Officer. Data sheets shall list the mix design criteria, job mix formula, testing requirements and results.

Mix Design; GA.

At least ten days prior to placement of bituminous pavement the Contractor shall submit the mix proportions that meet the requirements specified in the MNDOT Standard Specifications and that will produce bituminous pavement of the quality required. The mix design will be developed according to the MNDOT Standard Specifications. The mix design in Table 2331-14 of MNDOT 2331 shall have the properties required.

If aggregate or asphalt is utilized from sources other than those initially submitted with the mix proportions, the aggregate is processed using a different crusher, or if a different type or grade of asphalt is used, the Contractor shall notify the Contracting Officer in writing before incorporating the material into the work. If the Contracting Officer determines that a new mix design is required, the Contractor shall submit another mix design and submit it for approval.

Job Mix Formula (JMF)

The results of the mix design process is the Job Mix Formula. The JMF submitted shall contain the following:

- 1. The percentage of aggregate passing each of the specified sieves.
- 2. The percent asphalt cement to be added to the mixture.
- 3. The target air voids will be 4 percent.
- 4. The maximum specific gravity of the mixture obtained in the laboratory.
- 5. The bulk specific gravity of the mixture obtained in the laboratory.
- 6. The percent VMA of the mixture obtained in the laboratory.
- 7. The Stability of the mix.
- 8. Flow.

- 9. Calculated Film Thickness (Microns).*
- 10. Calculated Dust/Asphalt Ratio.**

PART 2 PRODUCTS

All products shall meet the requirements of the referenced sections of the MNDOT Standard Specifications. Aggregate shall be A, B, C, or D, as specified in the MNDOT 3139. Asphalt type and grade shall be as indicated in MNDOT 2331.

2.1 TACK COAT

Tack coat shall meet the requirements of MNDOT 2357.

2.2 BITUMINOUS PAVEMENT

2.2.1 Wearing Course

The wearing course shall consist of Type 41 as specified in MNDOT 2331. The lift thickness for wearing course shall not exceed 2 inches.

2.2.2 Non Wearing Course (Base Course)

The non-wearing course shall consist of Type 31 as specified in MNDOT 2331. The lift thickness for non-wearing course shall not exceed 2 inches.

PART 3 EXECUTION

3.1 GENERAL

Refer to SECTION 02722: AGGREGATE BASE OR SURFACE COURSE for subgrade preparation and aggregate base.

Furnishing, paving, finishing, compaction, and installation of Plant Mixed Bituminous Pavement shall meet the requirements of the specified sections of the MNDOT Standard Specifications, except as otherwise required herein. Where referenced in the MNDOT Standard Specifications, Engineer shall mean the Contracting Officer and Department shall mean the Government.

For road reconstruction the Contractor shall take a minimum of 3 road cores from each section. Road cores shall be tested for thickness of wear course and non-wear course, asphalt cement content, and aggregate gradation. Replace each section in kind. The Contractor will have the option to use the approved JMF provided it exceeds the quality of the existing pavement section and approval is obtained in writing from the Contracting Officer.

3.2 TESTING

3.2.1 General

All testing expenses shall be the Contractor's responsibility. Prior to sampling and testing the work, testing laboratories shall be inspected and

approved in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL. All testing shall conform with the requirements of MNDOT 2340.

3.2.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction or corrective action required. Draft copies of field testing results shall be submitted to the Contracting Officer within 24 hours of the test, as directed.

3.2.3 Response to Results and Corrective Action

As required in MNDOT 2340.

3.2.4 Testing Schedule

Perform the following testing; the frequency of testing listed applies to each separate area paved. Core samples will be used to measure the thickness and specified density. Compare Marshall density test results from the bag samples to the bituminous mixture core samples to determine the pay factor in accordance with MNDOT 2331.

<u>Material</u>	<u>Test</u>	Frequency
Aggregate for Bituminous Mixture	Sieve Analysis (ASTM C 117 & ASTM C 136)	Every 125 Cubic Yards
Bituminous Non-Wearing and Wearing Course	Core Samples (MNDOT 2331)	3 for each course
	Extraction (ASTM D 2172)	3 for each course
	Marshall Density	1 for each course

⁻⁻ End of Section --

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SECTION 02754 CONCRETE BASE AND PAVEMENT

06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced The publications are referred to in the text by basic designation only.

MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 2201 Concrete Base

MNDOT 2301 Concrete Pavement

MNDOT 2461 Structural Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 39

(1996) Compressive Strength of Cylindrical Concrete Specimens

ASTM C 143

(1990a) Slump of Hydraulic Cement Concrete

ASTM C 231

(1997) Air Content of Freshly Mixed Concrete by the Pressure Method

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES.

SD-07 Schedules

Paving Schedule; FIO

Paving schedule at least 7 days prior to start of paving.

SD-09 Reports

Concrete Mixture Proportions; GA

At least ten days prior to placement of concrete, the Contractor shall submit the mixture proportions that meet requirements specified in the 1995 MNDOT Standard specifications and that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions meet requirements specified in the 1995 MNDOT Standard specifications and will produce concrete of the quality specified.

Testing; FIO

A summary of testing results indicated in PARAGRAPH: TESTING shall be submitted when concrete work is substantially complete for each paved area.

PART 2 PRODUCTS

2.1 MATERIALS

All products shall meet the requirements of the specified sections of the 1995 MNDOT Standard Specifications, Sections: MNDOT 2201, MNDOT 2301, MNDOT 2461.

PART 3 EXECUTION

3.1 GENERAL

Refer to SECTION 02722: AGGREGATE BASE OR SURFACE COURSE for subgrade preparation and aggregate base.

Concrete pavement construction, finishing, curing, joints, and testing for roads and driveways shall meet the requirements specified in the 1995 Minnesota Department of Transportation Standard Specifications for construction (1995 MNDOT Standard Specifications), Sections: MNDOT 2201, MNDOT 2301, MNDOT 2461

3.2 TESTING

3.2.1 General

All testing expenses shall be the Contractor's responsibility. Prior to sampling and testing the work, testing laboratories shall be inspected and approved in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL.

3.2.2 Transmittal

The Contracting Officer shall be informed of test results daily for direction or corrective action required. Draft copies of field testing results shall be submitted to the Contracting Officer within 24 hours of the test, as directed.

3.2.3 Corrective Action

Tests of materials which do not meet the contract requirements (failing tests) will not be counted as part of the required testing. Each such failing test must be retaken at the same location as the failing test was taken. If testing indicates material does not meet the contract

requirements, the material represented by the failing test shall be removed. The quantity of material represented by the failing test shall be determined by the Contracting Officer up to the quantity represented by the testing frequency. The Contractor may increase testing frequency in the vicinity of a failing test in order to reduce removal requirements, as approved by the Contracting Officer. Such increases in testing frequency shall be at the Contractor's expense and at no additional cost to the Government.

3.2.4 Testing Schedule

a. Surface Smoothness

The finished surfaces of the pavements shall have no abrupt change of 1/8 inch or more, and all pavements shall be within the tolerances specified in Table 1 when checked with the straightedge.

Table 1
Straightedge Surface Smoothness - Pavements

Pavement Category	Direction of Testing	Tolerances (Inches)
Roads and Streets	Longitudinal Transverse	3/16 1/4
Tank Hardstrands, Parking Areas, Open Storage Areas	Longitudinal Transverse	1/4 1/4

The surface of the pavement shall be tested with the straightedge to identify all surface irregularities exceeding the tolerances specified above. The entire area of the pavement shall be tested in both a longitudinal and a transverse direction on parallel lines approximately 15 feet apart. The straightedge shall be held in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points.

b. Strength Tests

Compressive tests shall be made to determine that concrete strength specified in MNDOT 2461 is achieved prior to opening pavement to traffic.

Compressive tests will be made and cured according to ASTM C 39.

Concrete cylinders will be tested for compressive strength according to ASTM C 39. 1 set of 5 cylinders per 4,000 square yards or fraction thereof shall be sampled and tested for each pavement or driveway area.

c. Tests for Uniformity

Uniformity will be tested by comparing slump (ASTM C 143), and air content (

ASTM C 231) of 2 individual samples taken from approximately the 1/6 and 5/6 points of the batch as discharged at the site of placement. Satisfactory uniformity results are specified in MNDOT 2461.

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PAVEMENT MARKINGS

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SECTION 02763

PAVEMENT MARKINGS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 247

(1981) Glass Beads Used in Traffic Paint

MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MUTCD Minnesota Manual on Uniform Traffic

Control Devices

Attachment Specification for Epoxy Resin Pavement

Markings (Free of Toxic Heavy Metals)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment Lists; GA.

Lists of proposed equipment, including descriptive data, and notifications of proposed Contractor actions as specified in this section. List of removal equipment shall include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation.

SD-06 Instructions

Mixing, Thinning and Application; FIO.

Manufacturer's current printed product description and Material Safety Data Sheets (MSDS) for each type paint/color proposed for use.

SD-08 Statements

Qualifications; FIO.

Document certifying that personnel are qualified for equipment operation and handling of chemicals.

SD-09 Reports

Material Tests; FIO.

Certified copies of the test reports, prior to the use of the materials at the jobsite. Testing shall be performed in an approved independent laboratory.

SD-13 Certificates

Volatile Organic Compound (VOC) Content; FIO.

Certificate stating that the proposed pavement marking paint meets the VOC regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which the project is located.

1.3 DELIVERY AND STORAGE

All materials shall be delivered and stored in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's name, and directions, all of which shall be plainly legible at time of use.

1.4 EQUIPMENT

All machines, tools and equipment used in the performance of the work shall be approved and maintained in satisfactory operating condition. Equipment operating on roads and runways shall display low speed traffic markings and traffic warning lights.

1.4.1 Pavement Marking Application Equipment

The equipment to apply pavement marking shall be a self-propelled or mobile-drawn pneumatic spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. The machine shall have a speed during application not less than 5 mph, and shall be capable of applying the stripe widths indicated, at the paint coverage rate specified in paragraph APPLICATION, and of even uniform thickness with clear-cut edges. Equipment used for marking shall be capable of placing the prescribed number of lines at a single pass as solid lines, intermittent lines or a combination of solid and intermittent lines using a maximum of two different colors of paint as specified. The applicator shall have reservoirs or tanks of sufficient capacity and suitable gauges to apply pavement markings in accordance with requirements specified. Tanks shall be equipped with suitable air-driven mechanical agitators. The spray mechanism shall be equipped with quick-action valves

conveniently located, and shall include necessary pressure regulators and gauges in full view and reach of the operator. Strainers shall be installed in supply lines to ensure freedom from residue and foreign matter that may cause malfunction of the spray guns. The applicator shall be readily adaptable for attachment of an air-actuated dispenser for the reflective media approved for use. Pneumatic spray guns shall be provided for hand application of paint in areas where the mobile applicator cannot be used.

1.4.2 Reflective Media Dispenser

The dispenser for applying the reflective media shall be attached to the pavement marking applicator and shall operate automatically and simultaneously with the applicator through the same control mechanism. The dispenser shall be capable of adjustment and designed to provide uniform flow of reflective media over the full length and width of the stripe at the rate of coverage specified in paragraph APPLICATION, at all operating speeds of the applicator to which it is attached.

1.4.3 Surface Preparation Equipment

1.4.3.1 Sandblasting Equipment

Sandblasting equipment shall include an air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be painted. The compressor shall be capable of furnishing not less than 150 cfm of air at a pressure of not less than 90 psi at each nozzle used, and shall be equipped with traps that will maintain the compressed air free of oil and water.

1.4.3.2 Waterblast Equipment

The water pressure shall be specified at 2600 psi at 140 degrees F in order to adequately clean the surfaces to be marked.

1.4.4 Marking Removal Equipment

Equipment shall be mounted on rubber tires and shall be capable of removing markings from the pavement without damaging the pavement surface or joint sealant. Waterblasting equipment shall be capable of producing an adjustable, pressurized stream of water. Sandblasting equipment shall include an air compressor, hoses, and nozzles. The compressor shall be equipped with traps to maintain the air free of oil and water.

1.4.4.1 Shotblasting Equipment

Shotblasting equipment shall be capable of producing an adjustable depth of removal of marking and pavement. Each unit shall be self-cleaning and self-contained, shall be able to confine dust and debris from the operation, and shall be capable of recycling the abrasive for reuse.

1.4.4.2 Chemical Equipment

Chemical equipment shall be capable of application and removal of chemicals

from the pavement surface, and shall leave only non-toxic biodegradeable residue.

1.4.5 Traffic Controls

Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Equipment shall be marked with large warning signs indicating slow-moving equipment in operation. Comply with the Minnesota Manual on Uniform Traffic Control Devices (MUTCD).

1.5 HAND-OPERATED, PUSH-TYPE MACHINES

All machines, tools, and equipment used in performance of the work shall be approved and maintained in satisfactory operating condition. Hand-operated push-type machines of a type commonly used for application of markings to pavement surfaces will be acceptable for marking small streets and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of uniform application at coverage specified. Sandblasting equipment shall be provided as required for cleaning surfaces to be marked. Hand-operated spray guns shall be provided for use in areas where push-type machines cannot be used.

1.6 MAINTENANCE OF TRAFFIC

1.6.1 Roads, Streets, and Parking Areas

When traffic must be rerouted or controlled to accomplish the work, the necessary warning signs, flagpersons, and related equipment for the safe passage of vehicles shall be provided.

1.7 WEATHER LIMITATIONS FOR REMOVAL

Pavement surface shall be free of snow, ice, or slush. Surface temperature shall be at least 50 degrees F and rising at the beginning of operations, except those involving shot or sand blasting. Operation shall cease during thunderstorms. Operation shall cease during rainfall, except for waterblasting and removal of previously applied chemicals. Waterblasting shall cease where surface water accumulation alters the effectiveness of material removal.

PART 2 PRODUCTS

2.1 PAVEMENT MARKINGS

The pavement markings shall conform with the Attachment, "Specification for Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals)".

2.2 REFLECTIVE MEDIA

Reflective media shall conform to AASHTO M 247, Type I, "Standard Gradation", except that the beads shall have a minimum of 80 percent true

spheres.

2.3 SAMPLING AND TESTING

Materials proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at source of supply, sufficiently in advance of needs to allow 60 days for testing. Upon notification by the Contractor that the material is at the site or source of supply, a sample shall be taken by random selection from sealed containers by the Contractor in the presence of a representative of the Contracting Officer. Samples shall be clearly identified by designated name, specification number, batch number, manufacturer's formulation number, project contract number, intended use, and quantity involved. Testing shall be performed in an approved independent laboratory. If materials are approved based on reports furnished by the Contractor, samples will be retained by the Government for possible future testing should the material appear defective during or after application.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surfaces to be marked shall be thoroughly cleaned before application of the pavement marking material. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion as directed. Areas of old pavement affected with oil or grease shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint. Pavement surfaces shall be allowed to dry, when water is used for cleaning, prior to striping or marking. Surfaces shall be recleaned, when work has been stopped due to rain.

3.1.1 Cleaning Existing Pavement Markings

In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings, which are in good condition but interfere or conflict with the newly applied marking patterns, shall be removed. Deteriorated or obscured markings that are not misleading or confusing or interfere with the adhesion of the new marking material do not require removal. New preformed and thermoplastic pavement markings shall not be applied over existing preformed or thermoplastic markings. Whenever grinding, scraping, sandblasting or other operations are performed the work must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed the pavement surface shall be blown off with compressed air to remove residue and debris resulting from the cleaning work.

3.2 APPLICATION

All pavement markings and patterns shall be placed as shown on the plans. The color shall be as indicated. All parking lot markings shall be white applied to a width of 4 inches.

3.2.1 Application

Apply epoxy pavement markings in accordance with the attached specification. Furnish and place epoxy pavement markings together with appropriate glass spheres for reflectorizing the resin.

3.2.2 Spacing and Layout

- 1. Apply all markings in accordance with plan layout and details.
- 2. The Contractor shall place necessary "spotting" at appropriate points to provide horizontal control for striping, and determine necessary starting and cutoff points. Skip line intervals will not be marked. Longitudinal joints and pavement edges shall serve as horizontal control when so directed.

A tolerance of 1/8 inch under and 1/2 inch over the specified width will be allowed for striping provided the variance is gradual and does not detract from the general appearance. Skip line segments may vary up to 1/4 foot from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the control guide shall not exceed 2 inches. Material shall not be applied ver a longitudinal joint. Establishment of application tolerances shall not relieve the Contractor of the responsibility to comply as closely as practicable with the planned dimensions.

3.3 PROTECTION OF TRAFFIC AND MARKINGS

Furnish and install all necessary warning and directional signs and devices in order to; maintain traffic whenever pavement markings are applied in the presence of traffic, and to protect uncured markings as needed until traffic can cross markings without damaging markings. When necessary, a pilot car and flaggers shall be used to provide adequate control and direction of traffic.

3.4 MARKING REMOVAL

Pavement marking, including plastic tape, shall be removed in the areas shown on the drawings. Removal of marking shall be as complete as possible without damage to the surface. Aggregate shall not be exposed by the removal process. After the markings are removed, the cleaned pavement surfaces shall exhibit adequate texture for remarking as specified in paragraph SURFACE PREPARATION. Contractor shall demonstrate removal of pavement marking in an area designated by the Contracting Officer. The demonstration area will become the standard for the remainder of the work.

3.4.1 Equipment Operation

Equipment shall be controlled and operated to remove markings from the

pavement surface, prevent dilution or removal of binder from underlying pavement, and prevent emission of blue smoke from asphalt or tar surfaces.

3.4.2 Cleanup and Waste Disposal

The worksite shall be kept clean of debris and waste from the removal operations. Cleanup shall immediately follow removal operations in areas subject to air traffic. Debris shall be disposed of at approved sites.

3.5 ATTACHMENT

Specification for Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals) is attached.

-- End of Section --

Attachment

Specifications for Epoxy Resin Pavement Markings (Free of Toxic Heavy Metals)

1.0 DESCRIPTION

The work shall consist of furnishing and installing reflectorized white and yellow two-component, 100 percent solids epoxy pavement markings. Applications are lines, legends, symbols, crosswalks and stop lines placed on properly prepared asphaltic and portland cement concrete pavement surfaces in accordance with the Special Provisions, Plans, this Attachment and as directed by the Engineer. Upon curing, the materials produce pavement markings of specified thickness, width and retroreflectivity that resist wear from high traffic volumes for several years. During darkness and weather permitting, yellow markings shall be readily distinguishable from white markings.

Values stated in the International System of Units SI apply only to projects to be constructed in Metric units of measure. Values stated in inch-pound units (in parenthesis) apply only to projects to be constructed in English units of measure.

2.0 QUALIFICATIONS

- 2.1 Epoxy striping is a technical process requiring specialized equipment, quality controlled materials and well-trained operators to produce functional, long life pavement markings. To minimize application failures, Mn/DOT requires epoxy materials, beads, the pavement marking contractor, and striper to be approved prior to the bidding process.
- 2.1.1 A pavement marking contractor and/or equipment may be qualified as follows:
- No previous epoxy striping on any construction contract-- contact Mn/DOT to arrange for field demonstration.
 - Recent epoxy striping experience with other state transportation departments contact Mn/DOT and provide experience summary, including names of persons to be contacted.
 - 3. If striper is new, contact Mn/DOT to arrange for field demonstration.
- 2.1.2 Before any epoxy product is acceptable for bid, it shall be field tested, evaluated, approved and assigned a product identification number by the Mn/DOT Materials Engineering Section. An approved product is placed on the APPROVED PRODUCTS LIST which is shown in Section 2.1.4.
 2.1.3 No change in product identification, chemical composition as indicated by infrared spectrophotometry and/or chemical analysis, or changes in the application requirements will be allowed. Any such changes shall be submitted for further evaluation.

Mn/DOT EPOXY PAVEMENT MARKING MATERIAL APPROVED PRODUCTS LIST

Fast Dry (Tyne I)

2.1.4

Manufacturer	Product	Appr Date
Polycarb Inc.	MARK 55.3	1998
Epoplex	LS 50	1998

Slow Dry (Type II)

Manufacturer Product Appr Date

Polycarb Inc. MARK 55 1991 Epoplex LS 60 1998

3.0 MATERIAL CLASSIFICATIONS

- 3.1 This specification provides for the classification of epoxy resin pavement marking systems by type.
- 3.1.1 Type I A fast cure material suitable for line applications and, under ideal conditions, may not require coning.
- 3.1.2 Type II A slow cure material suitable for all applications of pavement markings under controlled traffic conditions, i.e., coning is required and flagging may be as directed by the Engineer.
- 3.1.2 Only Slow Dry Type II epoxy material shall be used for epoxy pavement markings except when specified as otherwise in the Special Provisions.

4.0 EPOXY AND BEAD REQUIREMENTS

- 4.1 Epoxy Resin Material
- 4.1.1 The material shall be composed of epoxy resins and pigments only. No solvents are to be given off to the environment upon application to a pavement surface.
- 4.1.2 The composition shall be within the tolerance permitted for the product tested and approved by Mn/DOT. Type II material shall be completely free of TMPTA (Tri-Methyol Propane Tri-Acrylate) and other multi-functional monomers.
- 4.1.3 All materials shall be free of lead, cadmium, mercury, hexavalent chromium and other toxic heavy metals as defined by the United States Environmental Protection Agency.
- 4.1.4 Color The color of the white epoxy shall be a pure flat white, free of tints. The color of the yellow epoxy shall closely match Color Number 33538 of Federal Standard 595 and shall conform to the following CIE Chromaticity limits using illuminant "C":

x | 0.470 | 0.485 | 0.520 | 0.480 y | 0.440 | 0.460 | 0.450 | 0.420

Daylight Directional Reflectance (Y), white, minimum 83 Daylight Directional Reflectance (Y), yellow, minimum 50

Testing will be according to:

Daylight Directional Reflectance ASTM D 2805 Color ASTM D 2805

- 4.1.5 Adhesion Capabilities -- When the adhesion of the material to portland cement concrete (the concrete shall have a minimum of 2,070 kPa (300 psi.) tensile strength) is tested according to American Concrete Institute Committee 403 testing procedure, the failure of the system must take place in the concrete. The concrete shall be 32°C when the material is applied, after which the material shall be allowed to cure for 72 hours at 23±2°C.
- 4.1.6 Abrasion Resistance -- When the abrasion resistance of the material is tested according to ASTM C 501 with a CS-17 wheel under a load of 1000 grams for 1000 cycles, the wear index shall be no greater than 82. (The wear index is the weight in milligrams that is abraded from the sample under the test conditions).
- 4.1.7 Hardness -- The Type D durometer hardness of the material shall be not less than 75 nor more than 90 when tested according to ASTM D2240 after the material has cured for 72 hours at 23 ±2°C.
- 4.1.8 Tensile Strength -- The tensile strength of the material, when tested according to ASTM D

- 638, shall not be less than 41,370 kPa (6,000 psi.) after 72 hours cure at 23±2°C.
- 4.1.9 Compressive Strength -- The compressive strength of the material, when tested according to ASTM D 695, shall not be less than 82,700 kPa (12,000 psi.) after 72 hours cure at 23±2°C.
- 4.1.10 Shelf Life The individual components shall not require mixing prior to use when stored for a period of 12 months.
- 4.2 Glass Beads
- 4.2.1 Glass beads shall meet the requirements of AASHTO M247, Type I, and:
 - a. Coatings the beads shall be treated according to the manufacturers recommendations and meet the requirements of Section 4.4.2 of M247, and
 - Roundness— the beads shall have a roundness of at least 80%.
- 4.2.2 For 380 µm (15 mil) applications, glass beads shall be applied at a rate of at least 3.0 kg/L (25 lb./gal.). A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.
- 4.3 Time to No-Track -- Type I material shall be in "no-tracking" condition in 15 minutes or less and within 45 minutes for Type II material. The "no-tracking" condition shall be determined on an application of specified thickness to the pavement and covered with glass beads at the rate of at least 3.0 kg/L (25 lb/gal.). The lines for this test shall be applied with striping equipment operated so as to have the material at manufacturer's recommended application temperature. This maximum "no-tracking" time shall not be exceeded when the pavement temperature varies from 10 to 49° C (50 to 120° F) and under all humidity conditions, providing the pavement is dry. The no-tracking time shall be determined by passing over the line with a passenger car or pickup truck at a speed of 40 to 55 kmph (25 to 35 mph) in a simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 15 m (50 ft.) shall be considered as showing "no-tracking" and conforming to this requirement for time to "no-track."

5.0 APPLICATION EQUIPMENT AND PROCEDURES

- 5.1 Equipment
- 5.1.1 Equipment furnished shall include an applicator truck of adequate size and power, designed to apply an epoxy resin material and glass beads in a continuous or intermittent line pattern. The equipment shall be capable of placing stripes on the left and right sides. The left carriage shall be capable of placing two lines simultaneously with either line in a solid or intermittent pattern in yellow or white. With change in color usage, an amount of material equal to fifteen 3 m (10 ft.) stripes shall be wasted to eliminate the change of the incorrect color being applied.
- 5.1.2 The applicator truck (striper) and other vehicles in the striping train shall have permanently mounted Type C flashing arrowboards. They shall be visible to oncoming or following traffic, depending on the type of line being placed. Arrowboard requirements are detailed in the "Field Manual" of the Minnesota Manual of Traffic Control Devices. Also, truck equipment shall be capable of accumulating the footage applied per gun, individually each day. Only material application shall activate the footage accumulators. The readout shall be digital and not adjustable.
- 5.1.3 The equipment shall be capable of applying glass beads in a pressurized system at a rate of at least 3.0 kg/L (25 lb./gal.). A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.
- 5.1.4 All guns on the spray carriages shall be in full view of the operator(s) during operation.
- 5.1.5 Each crew shall include at least one technical expert knowledgeable in equipment operation, application techniques, control of traffic, and safety regulations.
- 5.2 Procedures
- 5.2.1 Pavement markings shall be placed in accordance with the details shown in the Plans and the control points established by the Engineer.
- 5.2.2 The road surface shall be cleaned at the direction of the Engineer just prior to an application.
 Pavement cleaning shall consist of at least brushing with a rotary broom (non-metallic), or as

- recommended by the material manufacturer and acceptable to the Engineer. New Portland cement concrete surfaces shall be sandblasted clean to remove any surface treatments and/or laitance. On low speed [Speed Limit 65 km/h (40 mph) or less] urban portland cement concrete roadways, sandblast cleaning shall be used for all epoxy pavement markings.
- 5.2.3 If the roadway surface is dry, the epoxy material application shall immediately follow the pavement cleaning and be preceded by an air blast. However, markings shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface before the material can be applied.
- 5.2.4 The Engineer will place necessary spotting at appropriate points as overall horizontal control for striping and to indicate necessary starting and cutoff points. Broken line intervals will not be marked. Longitudinal joints, pavement edges, and existing markings shall serve as control points when so directed.
- 5.2.5 A 380 µm (15 mil) epoxy line requires a liter of mixed components for every 25.8 m (84.5 ft.) of 100 mm (4 in.) wide line. Field measurements are inserted into the following equation: Line Thickness in micrometers = Liters x 0.001 x 10⁻³ x m³ divided by the quantity Length in meters x width in meters (Thickness in inches = Gallons x 231 cubic inches divided by the quantity Length (inches) x Width (inches)). Use 3.785 liters per gallon if epoxy is metered in gallons.
- 5.2.6 The minimum line width shall be its nominal width with 6 mm (¼ in.) greater than the nominal width allowed provided the variation is gradual and does not detract from the general appearance. Broken line segments, normally 2 m (6.56 ft.) every 10 m (32.81 ft.), may vary up to 75 mm (3 in.) from the specified lengths provided the over and under variations are reasonably compensatory. Alignment deviations from the control guide shall not exceed, except when approved by the Engineer. Material shall not be applied over a longitudinal joint. Establishment of application tolerances shall not relieve the Contractor of his responsibility to comply as closely as practicable with the planned dimensions.
- 5.3 Spraying Operation
- 5.3.1 Placement of epoxy materials shall be permitted only on a clean, dry pavement surface and air and pavement temperatures at least 10° C (50° F) unless the manufacturer, in writing, approves a lower temperature.
- 5.3.2 Two parts of epoxy component A (pigment) and one part component B (hardener) shall be heated separately at 43°±1° C (110°±30° F) and thoroughly mixed. All material heated over 60° C (140° F) shall be discarded. The sprayed epoxy shall be applied at 43°±1° C (110°±30°F) or as recommended by the manufacturer.
- 5.3.3 Glass beads shall be applied immediately after the placement of the epoxy. If two bead gradations are required by the Special Provisions, two bead dispensers are required to deliver the specified drop rates. Otherwise the dispenser system must deliver at a minimum 3.0 kg (25 lb./gal.) of beads per liter of epoxy material. A greater bead application rate may be necessary for meeting the performance criteria (minimum levels of retroreflectivity). This will require contractors to consult with all the material manufacturers.
- 5.3.4 The Contractor shall cooperate with inspection personnel in reviewing operation of the equipment, safety precautions, measurement of materials (components and beads), computations to determine specific and daily application rates, sampling materials, making other measurements, such as epoxy thickness, and notifications as to work schedule.
- 5.3.5 Only Type II epoxy material shall be used for epoxy pavement markings except when specified as otherwise in the Special Provisions.
- 5.3.6 Traffic control for the pavement marking operations shall be in substantial conformance with the "Field Manual," Minnesota Manual of Uniform Traffic Control Devices. A shadow vehicle with a truck-mounted attenuator shall be used on high speed [SPEED LIMIT (65 km/h) (40 mph) and greater], high volume (ADT 1500 and greater) highways.

- 6.1 One pint samples of each manufacturer's lot or batch furnished for the contract shall be submitted to Mn/DOT at the time of manufacturing. One pint samples of both Part A (yellow/white) & part B must be submitted to the Mn/DOT Materials Laboratory, 1400 Gervais Ave., Maplewood, Minnesota 55109. (612) 779-5550 or 5549, FAX: (612) 779-5616. Samples shall be identified as follows:
 - Manufacturer's Name
- Color
- Manufacturer's Product Number
- Intended state project numbers.

- Lot/Batch Number
- 4. Date Manufactured
- 6.2 Contractors will not be allowed to use material that has not meet the requirements of Sections 6.1 & 7.0. Contractors will be asked to remove material that does not conform to Sections 6.1 & 7.0 and replace with material that does.

7.0 CERTIFICATIONS

- 7.1 The manufacturer shall certify that the components meet the requirements of these specifications and are on the Mn/DOT Approved Product List.
- 7.2 Certifications shall be sent along with the samples in section 6.1.

8.0 CONTAINER MARKINGS

- 8.1 Containers for epoxy components shall be marked with the manufacturer's name, product identification number, lot or batch number, date of manufacture, color, net weight of contents.
- 8.2 Containers for glass beads shall be marked with the name of manufacturer, the wording "Glass Beads," lot or batch number, coating type, date manufactured, and the net weight.

9.0 ACCEPTANCE OF PAVEMENT MARKINGS

In order to be a long-life pavement marking, epoxy markings placed in Minnesota must retain a satisfactory level of retroreflectivity in addition to demonstrating good adhesion, resisting chipping, and exhibiting proper daytime and nighttime colors. These attributes have been observed and evaluated for several years and are the basis for acceptance/rejection procedures and values used herein.

- 9.1 Retroreflectivity
- 9.1.1 Acceptable Minimum Retroreflectivity Values

MINIMUM AVERAGE RETROREFLECTIVITY VALUES FOR EPOXY MARKINGS

(mcd/m²/lux)

THE R. P. LEWIS CO., LANSING, MICH.
200
140

- Described in Section 9.1.4 Miscellaneous Traffic Controls, Numbers 4 and 5.
- 9.1.2 <u>Retroreflectometers</u>— Measurements shall be taken with either a portable or mobile retroreflectometer conforming to 30-meter geometry which is defined as: the entrance angle (the angle between the illumination axis and the retroreflector axis) shall fall between 88.50° and 88.76° and the observation angle (the angle between the illumination axis and the observation axis) shall fall between 1.0° and 1.05°; and, the co-viewing angle (the complement of the entrance angle) shall fall between 2.29° and 2.50°. All retroreflectivity

readings and data analysis will be provided by Mn/DOT at no cost to the Contractor. Mn/DOT reserves the right to:

- make daytime and/or nighttime visual inspections with or without the presence of the Contractor's representative, mainly to locate obvious or suspect areas of deficiency, and
- determine retroreflectivity of symbols, legends and lines wider than 200 mm (8 in.) using the portable retroreflectometer only.
- 9.1.3 <u>Test Segments</u> -- The following methodology will be used to evaluate retroreflectivity performance of in-service longitudinal line pavement markings:

LENGTH AND NUMBER OF TEST SEGMENTS^a PER ROADWAY^b PER LINE TYPE^c

Length of Roadway	Number of Test Segments	Length of Test Segments
Less than 1.5 km (1 mi.)	1	300 m (0.2 mi.)
Greater than or equal to 1.5 km (1 mi.)	1 per 1.5 km (1 mi.)	300 m (0.2 mi.)

- a TEST SEGMENTS— Areas of a roadway chosen for measuring retroreflectivity of the line types.
- b ROADWAY—As used here, means that portion of a street or highway ordinarily used for vehicular traffic. In the event a street or highway includes two or more separate roadways, the term roadway shall refer to each roadway separately.
- c LINE TYPE-- Longitudinal lines of the same color and function. For example, white and yellow edge lines are each a line type.

9.1.4 Measurements in Test Segments

Portable Retroreflectometer

- Take a minimum of 20 readings in each test segment per line type.
- On broken lines (skip striping), measure every other stripe, taking no more than two readings per stripe with readings 0.5 m (20 in.) from the ends of the marking.
- For solid lines, divide test segment into ten areas of 30 m (100 ft.); space readings a minimum of 10 m (33 ft.) and a maximum of 30 m (100 ft.) apart.
- For 10 percent of each message type, take 5 readings on each message line; for 10
 percent of each symbol type, take 5 readings on each symbol.
- Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

Mobile Retroreflectometer

- Calibration of the instruments shall be in accordance with the manufacturer's instructions.
- Retroreflectivity shall be measured at a minimum rate of 20 percent of each roadway length by line type.
- Should another mobile unit be available, the maximum acceptable deviation for measurements made by the two different instruments of the same manufacturer and for the same roadway length shall be ± 10%.
- Repeatability for the given mobile unit shall be ± 6%.
- Upon completion of the evaluation, regardless of the results, additional test segments may be ordered by the Engineer.

Miscellaneous Controls

- 1. Take measurements on a clean, dry roadway.
- 2. Collect data in direction of traffic flow.
- Measurement units are: mcd/m²/lux.
- Wait at least two (2) weeks from date of placement of the markings before taking initial readings.
- Take after-one-winter readings in May or June to assure that spring rains have cleaned the beads.
- Randomly select test segments unless night reviews or other knowledge supersedes a random selection process.
- 7. Measure each line type separately.
- 8. The Engineer may request additional readings or test segments.
- In the event LASERLUX is not available, the Engineer may require the use of the portable retroreflectometer or establish an alternative evaluation plan.

9.1.5 Contents of Retroreflectivity Report

The report shall consist of:

- · State Project number
- · Trunk Highway number
- · Test date
- Geographical location of the test site(s), including distance from the nearest permanent site identification, such as a reference point.
- Identification of the pavement marking material tested: type, color, age, and transverse location on the road
- Identification of the retroreflectometer
- Remarks concerning the overall condition of the line, messages and symbols such as carryover of asphalt, snow plow damage, uneven distribution of beads, etc.
- · Average of the readings for each test segment with one standard deviation calculated.
- · Average of the readings for each message and symbol type.

9.2 Correction of Defects/Penalties

- All pavement markings not conforming to the requirements of the Contract shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer. Removal of unacceptable work shall be accomplished with suitable blasting or grinding equipment unless other means are authorized by the Engineer.
- 2. Where yield computations show a deficiency in material usage of not more than 20 percent, Mn/DOT may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in material usage exceeds 20%, Mn/DOT may require removal and replacement to the satisfaction of the Engineer unless other means are approved by the Engineer.
- If the Engineer requires removal and replacement, the contractor shall remove (by an approved process) at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width shall be one inch wider all around the nominal width of the pavement marking to be removed.
- 4. Where initial retroreflectivity falls below the minimum acceptable levels but not more than 20%, the Engineer may require satisfactory repair or may accept the work at a reduced unit price which is in direct proportion to the percent of the deficiency. Where the deficiency in retroreflectivity exceeds 20%, i.e., less than 240 mcd/m²/lux for white and 160 mcd/m²/lux for yellow, the Engineer may require the removal and replacement to the satisfaction of the Engineer unless other means are approved by

the Engineer. Where minimum levels after one winter fall below the specified levels

- (170 mcd/m²/lux 135 mcd/m²/lux), Mn/DOT will notify the project contractor and manufacturer(s) of the failure. If the initial readings were above Mn/DOT's specified initial minimum levels (300 mcd/m²/lux 200 mcd/m²/lux), the Engineer, contractor, and manufacturer(s) of the material(s) shall review the project together. Based on the review an of all known aspects, the Engineer will make a determination as to why the job failed and notify the Contractor, pavement marking contractor, and/or manufacturer(s) in writing.
- If this process has to be repeated on several projects with either the same contractor and/or manufacturer(s), Mn/DOT will take corrective action. This corrective action will be a two step process:
 - Step 1 Pavement marking contractor/manufacturer(s) will be considered not approved for Mn/DOT projects, except to bring workmanship/product back into compliance.
 - Step 2 If the first step cannot be attained, pavement marking contractor/ manufacturer(s) will not be allowed to participate in Mn/DOT projects and/or be removed from Approved Product List.

10.0 DOCUMENTATION

Contractors applying epoxy pavement markings for Mn/DOT under a contract are required to fill out the attached "Construction Striper Operations Daily Log" form. These forms shall be completed at the end of each project and faxed to the "Reflective Systems Unit" at (612) 797-3181 Attn: Jim Carlson. Failure to submit completed forms may result in 10% of the overall contract price for epoxy pavement markings held back. Also, if forms are not sent in to the reflective systems unit in a timely manner projects will not be inspected during optimum times for meeting their performance criteria. Any questions regarding this form can be answered by calling the Reflective Systems Unit at (612) 797-3183.

Construction Striper Operations Daily Log E Contract Striper Operations Daily Log _ D X SP Number: Contractor: Record 0 of 0 Date: Equipment Numbers Material Supplier Lot No. InspecuSupy. Reg Hrs O.T. Hrs Help Locate Striper: Tape Nurse: Epoxy I Memo Traffic 1: Epoxy II Traffic 2: Thermo Default Aux Unit: Beads Save H Material(s) Undo Exit load Beads Pounds Segment District of D City: Int Int Begin Ref Pnt Trav Equip Wthr Time Delay Delay S Hwy Ref Pnt Work Types A: White Edge B: Yellow Edge C: White Skip D: Yellow Ctl. E: 8" White Gore F: 8" Yellow Gore G: Messages H: Stop Bars I: Cross walk M: Other Work N: Only Intersections/Interchanges

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SECTION 02770

CONCRETE SIDEWALKS, CURBS AND GUTTERS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182 (1991) Burlap Cloth Made from Jute or Kenaf

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 615	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 616	(1996a) Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 617	(1996a) Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM C 31	(1996) Making and Curing Concrete Test Specimens in the Field
ASTM C 143	(1990a) Slump of Hydraulic Cement Concrete
ASTM C 171	(1997) Sheet Materials for Curing Concrete
ASTM C 172	(1997) Sampling Freshly Mixed Concrete
ASTM C 173	(1996) Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(1997) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 309	(1997) Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C 920 (1995) Elastomeric Joint Sealants

ASTM D 1751 (1983; R 1991) Preformed Expansion Joint

Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient

Bituminous Types)

ASTM D 1752 (1984; R 1996) Preformed Sponge Rubber and

Cork Expansion Joint Fillers for Concrete

Paving and Structural Construction

ASTM D 3405 (1996) Joint Sealants, Hot-Applied, for

Concrete and Asphalt Pavements

MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 2461 Structural Concrete

MNDOT 2521 Walks

MNDOT 2531 Concrete Curbing

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Schedules

Concrete placement schedule; FIO

Provide schedule at least 7 days prior to start of placement.

SD-09 Reports

Concrete Mixture Proportions; GA.

At least ten days prior to placement of concrete, the Contractor shall submit the mixture proportions that meet requirements specified in the MNDOT Standard specifications and that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions meet requirements specified in the MNDOT Standard specifications and will produce concrete of the quality specified.

Testing; FIO.

Copies of all test reports within 24 hours of completion of the test.

SD-18 Records

Concrete; FIO.

Copies of certified delivery tickets for all concrete used in the construction.

1.3 WEATHER LIMITATIONS

1.3.1 Placing During Cold Weather

Concrete placement shall not take place when the air temperature reaches 40 degrees F and is falling, or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Provisions shall be made to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection shall be approved in writing. Approval will be contingent upon full conformance with the following provisions. The underlying material shall be prepared and protected so that it is entirely free of frost when the concrete is deposited. Mixing water and aggregates shall be heated as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating shall be approved. The aggregates shall be free of ice, snow, and frozen lumps before entering the mixer. Covering and other means shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.3.2 Placing During Warm Weather

The temperature of the concrete as placed shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed 95 degrees F at any time.

1.4 PLANT, EQUIPMENT, MACHINES, AND TOOLS

1.4.1 General Requirements

Plant, equipment, machines, and tools used in the work shall be subject to approval and shall be maintained in a satisfactory working condition at all times. The equipment shall have the capability of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Use of the equipment shall be discontinued if it produces unsatisfactory results. The Contracting Officer shall have access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

1.4.2 Slip Form Equipment

Slip form paver or curb forming machine, will be approved based on trial use on the job and shall be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in 1 pass.

PART 2 PRODUCTS

2.1 CONCRETE

Concrete shall conform to the applicable requirements of MNDOT 2461, MNDOT 2521, and MNDOT 2531 except as otherwise specified.

2.1.1 Air Content

Mixtures shall have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.2 Slump

The concrete slump shall be as required by MNDOT 2521 for sidewalks and MNDOT 2531 for curb and gutter as applicable to the method of placement.

2.1.3 Reinforcement Steel

Reinforcement bars shall conform to ASTM A 615, ASTM A 616, or ASTM A 617. Wire mesh reinforcement shall conform to ASTM A 185.

2.2 CONCRETE CURING MATERIALS

2.2.1 Impervious Sheet Materials

Impervious sheet materials shall conform to ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

2.2.2 Burlap

Burlap shall conform to AASHTO M 182 for Class 3.

2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C 309, Type 2, Class B.

2.3 CONCRETE PROTECTION MATERIALS

Concrete protection materials shall be a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

2.4 JOINT FILLER STRIPS

2.4.1 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D 1751 or ASTM D 1752, 1/2 inch thick, unless otherwise indicated.

2.5 JOINT SEALANTS

2.5.1 Joint Sealant, Cold-Applied

Joint sealant, cold-applied shall conform to ASTM C 920.

2.5.2 Joint Sealant, Hot-Poured

Joint sealant, hot-poured shall conform to ASTM D 3405.

2.6 FORM WORK

Form work shall be designed and constructed to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Wood forms shall have a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning. Steel forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Steel forms shall have a nominal length of 10 feet with a minimum of 3 welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

2.6.1 Sidewalk Forms

Sidewalk forms shall be of a height equal to the full depth of the finished sidewalk.

2.6.2 Curb and Gutter Forms

Curb and gutter outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter as indicated and shall be securely fastened to and supported by the outside form. Rigid forms shall be provided for curb returns, except that benders or thin plank forms may be used for curb or curb returns with a radius of 10 feet or more, where grade changes occur in the return, or where the central angle is such that a rigid form with a central angle of 90 degrees cannot be used. Back forms for curb returns may be made of 1-1/2 inch benders, for the full height of the curb, cleated together. In lieu of inside forms for curbs, a curb "mule" may be used for forming and finishing this surface, provided the results are approved.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

The subgrade shall be constructed to the specified grade and cross section

prior to concrete placement. Subgrade shall be placed and compacted in conformance with SECTION 02722: AGGREGATE BASE OR SURFACE COURSE.

3.1.1 Sidewalk Subgrade

The subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

3.1.2 Curb and Gutter Subgrade

The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.3 Maintenance of Subgrade

The subgrade shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited.

3.2 FORM SETTING

Forms shall be set to the indicated alignment, grade and dimensions. Forms shall be held rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.2.1 Sidewalks

Forms for sidewalks shall be set with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment shall be checked with a 10 foot straightedge. Forms shall have a transverse slope as indicated with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after finishing has been completed.

3.2.2 Curbs and Gutters

The forms of the front of the curb shall be removed not less than 2 hours nor more than 6 hours after the concrete has been placed. Forms back of curb shall remain in place until the face and top of the curb have been finished, as specified for concrete finishing. Gutter forms shall not be removed while the concrete is sufficiently plastic to slump in any

direction.

3.3 SIDEWALK CONCRETE PLACEMENT AND FINISHING

3.3.1 Formed Sidewalks

Concrete shall be placed in the forms in one layer. When consolidated and finished, the sidewalks shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated with an approved vibrator, and the surface shall be finished to grade with a strike off.

3.3.2 Concrete Finishing

After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, the surface shall be finished with a wood float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

3.3.3 Edge and Joint Finishing

All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8 inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

3.3.4 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 5/16 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.4 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

3.4.1 Formed Curb and Gutter

Concrete shall be placed to the section required in a single lift. Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall be finished with a standard curb "mule".

3.4.2 Curb and Gutter Finishing

Approved slipformed curb and gutter machines may be used in lieu of hand placement.

3.4.3 Concrete Finishing

Exposed surfaces shall be floated and finished with a smooth wood float

until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with a fine-hair brush with longitudinal strokes. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float.

3.4.4 Joint Finishing

Curb edges at formed joints shall be finished as indicated.

3.4.5 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.5 SIDEWALK JOINTS

Sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width. Transverse expansion joints shall be installed every 50 feet or less and at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, transverse expansion joints shall be installed as indicated. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated.

3.5.1 Sidewalk Contraction Joints

The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-third of the sidewalk slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

3.5.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 1/2 inch joint filler strips for the full depth of the sidewalk. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be

rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period, expansion joints shall be cleaned and filled with joint sealant where adjacent to structures. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and atmospheric and concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

3.5.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

3.6 CURB AND GUTTER JOINTS

Curb and gutter joints shall be constructed at right angles to the line of curb and gutter.

3.6.1 Contraction Joints

Contraction joints shall be constructed directly opposite contraction joints in abutting portland cement concrete pavements and spaced so that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length.

3.6.2 Expansion Joints

Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter full depth. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement or other in place fixed objects, and shall be of the same type and thickness as joints in the pavement. Where curb and gutter do not abut portland cement concrete pavement, expansion joints at least 1/2 inch in width shall be provided.

3.7 CURING AND PROTECTION

3.7.1 General Requirements

Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Unhardened concrete shall be protected from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

3.7.1.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of

burlap. Mats shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.7.1.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3.7.1.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet per gallon for the total of both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed before the concrete in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for curing concrete pavement shall be provided at a location accessible to the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and

surface tests, and from any other possible damage to the continuity of the membrane.

3.7.2 Backfilling

After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

3.7.3 Protection

Completed concrete shall be protected from damage until accepted. The Contractor shall repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

3.7.4 Protective Coating

Protective coating of linseed oil mixture shall be applied to the exposed-to-view concrete surface to protect concrete placed during cold weather.

3.7.4.1 Application

Curing and backfilling operation shall be completed prior to applying two coats of protective coating. Concrete shall be surface dry and clean before each application. Coverage shall be by spray application at not more than 50 square yards per gallon for first application and not more than 70 square yards per gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture shall be in accordance with the manufacturer's instructions. Coated surfaces shall be protected from vehicular and pedestrian traffic until dry.

3.7.4.2 Precautions

Protective coating shall not be heated by direct application of flame or electrical heaters and shall be protected from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Material shall not be applied at ambient or material temperatures lower than 50 degrees F.

3.8 FIELD QUALITY CONTROL

3.8.1 General Requirements

The Contractor shall perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, the Contractor shall take the action and submit reports as required below, and any additional tests to insure that the requirements of these specifications are met.

3.8.2 Concrete Testing

3.8.2.1 Strength Testing

The Contractor shall provide molded concrete specimens for strength tests. Samples of concrete placed each day shall be taken not less than once a day nor less than once for every 50 cubic yards of concrete. The samples for strength tests shall be taken in accordance with ASTM C 172. Cylinders for acceptance shall be molded in conformance with ASTM C 31 by an approved testing laboratory. Each strength test result shall be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

3.8.2.2 Air Content

Air content shall be determined in accordance with ASTM C 173 or ASTM C 231. ASTM C 231 shall be used with concretes and mortars made with relatively dense natural aggregates. Two tests for air content shall be made on randomly selected batches of each class of concrete placed during each shift. Additional tests shall be made when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. If results are out of tolerance, the placing foreman shall be notified and he shall take appropriate action to have the air content corrected at the plant. Additional tests for air content will be performed on each truckload of material until such time as the air content is within the tolerance specified.

3.8.2.3 Slump Test

Two slump tests shall be made on randomly selected batches of each class of concrete for every 50 cubic yards, or fraction thereof, of concrete placed during each shift. Additional tests shall be performed when excessive variation in the workability of the concrete is noted or when excessive crumbling or slumping is noted along the edges of slip-formed concrete.

3.8.3 Thickness Evaluation

The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine. If a slip form paver is used for sidewalk placement, the subgrade shall be true to grade prior to concrete placement and the thickness will be determined by measuring each edge of the completed slab.

3.8.4 Surface Evaluation

The finished surface of each category of the completed work shall be uniform in color and free of blemishes and form or tool marks.

3.9 SURFACE DEFICIENCIES AND CORRECTIONS

3.9.1 Thickness Deficiency

When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

3.9.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch. Areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

3.9.3 Appearance

Exposed surfaces of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

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SECTION 02870

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SECTION 02870

SITE FURNISHINGS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications shall be referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1996) Carbon Structural Steel
ASTM A 48	(1994a) Gray Iron Castings
ASTM A 48M	(1994) Gray Iron Castings (Metric)
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(1996) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 500	(1993) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	(1993) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 615/A 615M	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM B 26/B 26M	(1996a) Aluminum-Alloy Sand Castings
ASTM B 62	(1993) Composition Bronze or Ounce Metal Castings
ASTM B 108	(1996a) Aluminum-Alloy Permanent Mold Castings
ASTM C 150	(1996) Portland Cement
ASTM D 648	(1996) Deflection Temperature of Plastics Under Flexural Load

ASTM D 2990 (1995) Tensile, Compressive, and Flexural

Creep and Creep-Rupture of Plastics

ASTM F 1487 (1995) Standard Consumer Safety

Performance Specification for Playground

Equipment for Public Use

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Site Furnishings; GA.

Manufacturer's descriptive data and catalog cuts.

SD-04 Drawings.

Site Furnishing Standards; GA.

Drawings showing scaled details of proposed site furnishings, elevations for each type of site furnishing; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction.

SD-06 Instructions

Installation; GA.

Manufacturer's installation and maintenance instructions.

SD-08 Statements

Materials; GA.

A listing indicating the furnishings provided have been in proven satisfactory use for at least 2 years.

SD-09 Reports

Recycled Material; GA

A report of site furnishing parts consisting of recycled materials. Product specification data shall provide test information for deflection and creep in accordance with ASTM D 648 and ASTM D 2990 for site furnishings which use plastic lumber as a component, shall be submitted. The data shall provide a comparison of deflection and creep measurements to other comparable materials.

SD-14 Samples

Finish; GA.

Two sets of color data for each furnishing displaying manufacturer's color selections and finishes, and identifying those colors and finishes proposed for use.

1.3 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. The storage area shall be as designated. The materials shall be stored in a dry, covered area until installed.

1.4 INSPECTION

Site furnishings shall be inspected upon arrival at the job site for conformity to specifications and quality in accordance with paragraph MATERIALS. Unacceptable items shall be removed from the job site.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. The materials provided shall be of a type with proven satisfactory use for at least 2 years. Benches, drinking fountains, grills, and telephone enclosures shall be ADA approved.

2.1.1 Concrete

Portland cement shall conform to ASTM C 150 Types I, II, or III.

2.1.1.1 Cast-in-Place Concrete

Cast-in-place concrete materials and products shall conform to Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.1.2 Masonry

Masonry material and products shall conform to Section 04200 MASONRY.

2.1.3 Metal

Metallic materials and products shall conform to Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Metal components shall be furnished with factory drilled holes. Components shall be free of excess weld and spatter. Metal components with holes that will not be filled by hardware or hidden by other components will be rejected.

2.1.3.1 Steel

Structural steel products shall conform to ASTM A 36/A 36M, ASTM A 500 and ASTM A 501.

2.1.3.2 Reinforcing Steel

Steel used for reinforcement shall be deformed billet steel Grade 40. Steel shall conform to ASTM A 615/A 615M.

2.1.3.3 Cast Iron

Cast iron shall conform to ASTM A 48 Class 35 or better. The Contractor shall provide castings manufactured true to pattern and component parts that fit together in a satisfactory manner. Castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage, distortion, or other defects. Smooth castings shall be well-cleaned by sand or shot blasting.

2.1.3.4 Cast Aluminum

Cast aluminum shall conform to ASTM B 26/B 26M and ASTM B 108. The Contractor shall provide castings manufactured true to pattern and component parts that fit together in a satisfactory manner. Castings shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage, distortion, or other defects. Smooth castings shall be well-cleaned by sand or shot blasting.

2.1.3.5 Bronze, Copper and Other Ounce Metals

Bronze, copper, and other ounce metals shall conform to ASTM B 62.

2.1.4 Recycled Material

2.1.4.1 General Requirements

Recycled materials shall contain a minimum 85 percent recycled post-consumer product. Recycled materials shall be constructed or manufactured with a maximum 1/4-inch deflection or creep in any member in conformance with ASTM D 648 and ASTM D 2990.

2.1.4.2 High Density Polyethylene

The Contractor shall provide panels and components molded of ultraviolet (UV) and color stabilized polyethylene, with minimum 1/4 inch wall thickness; exposed edges shall be smoothed, rounded, and free of burrs and points; and the material shall be resistant to fading, cracking, fogging, and shattering. The material shall be non-toxic and have no discernible contaminates such as paper, foil, or wood. The material shall contain no more than 3 percent air voids. Material shall be resistant to deformation from solar radiation heat gain.

2.1.4.3 Structural Component

Recycled materials to include plastic lumber will not be used as structural components of site furnishings.

2.1.5 Fiberglass

Fiberglass shall consist of at least 3 laminations of chopped glass fibers impregnated with polyester resin, with colors and textures molded into all exposed surfaces so that colors resist fading. Fiberglass shall be resistant to cleaners, fertilizers, high power spray and salt.

2.2 HARDWARE

Hardware shall be stainless steel or galvanized steel as indicated, in accordance with ASTM A 153 and compatible with the material to which applied. All exposed hardware shall match in color and finish. Mounting hardware shall be concealed, recessed, and plugged.

2.3 ANCHORS

Anchors shall be provided, where necessary, for fastening site furnishings securely in place and in accordance with approved manufacturer's instructions. Anchoring devices that may be used, when no anchors are otherwise specified or indicated, include anchor bolts, slotted inserts, expansion shields for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; and lag bolts and screws for wood.

2.4 FINISH

Finish shall be as specified by the manufacturer or as indicated. Exposed surfaces and edges shall be rounded, polished, or sanded. Finish shall be non-toxic, non-glare, and resistant to corrosion. Exposed surfaces shall be smooth and splinter-free exposed surfaces.

2.4.1 Coatings

2.4.1.1 Galvanizing

Galvanized components shall be hot-dipped in zinc after fabrication in accordance with ASTM A 123. Tailings and sharp protrusions formed as a result of the hot-dip process shall be removed and exposed edges burnished.

2.4.1.2 Polyester Powder

Powder-coated surfaces shall receive electrostatic zinc coating prior to painting. Powder coating shall be electrostatically applied and oven cured. Polyester powder coating shall be resistant to ultraviolet (UV) light.

2.4.1.3 Polyvinyl-chloride (PVC)

PVC coating shall be primed with a clear acrylic thermosetting solution. The primed parts shall be preheated prior to dipping. The liquid polyvinyl chloride shall be ultraviolet (UV) stabilized and mold-resistant. The coated parts shall be cured. The coating shall be a minimum 2/25 inches thick plus or minus 0.020 inches and shall have an 85 durometer hardness with a slip-resistant finish.

2.4.2 Paint

Paint shall be factory applied with a minimum of 2 coats. Paint shall be weather-resistant and resistant to cracking, peeling and fading.

2.4.3 Color

Colors shall be selected by the Contracting Officer from manufacturer's standard colors and approved by Onwer.

2.5 SITE FURNISHING STANDARDS

Site furnishings shall be furnished to meet the minimum standards described in this specification.

2.6 BENCHES

- a. BuMor Recycled Plastic Bench: Model 16-PL, 6 feet, or approved equal. Surface mount, recycled plastic slats in 'Cedar', 'Green' polyester power-coat finish.
- b. Contact: Earl F. Andersen Company, Phone: 952-884-7300, Fax: 952-884-5619.

2.7 PICNIC TABLES

- a. Eaglebrook Products ADA Portable Picnic Table: Model 9853, or approved equal. Galvanized metal finish, 'Cedar' recycled plastic slats.
- b. DuMor Square Pedestal Table: Model 7633-33, or approved equal. 'Cedar' recycled plastic slats, 3-bench option for ADA accessibility, surface mount, 'Green' polyester powder-coat finish.
- c. DuMor Square Pedestal Table: Model 7634-34, or approved equal. 'Cedar' recycled plastic slats, 4-bench option, surface mount, 'Green' polyester powder-coat finish.
- d. Contact: Earl F. Andersen Company, Phone: 952-884-7300, Fax: 952-884-5619.

2.8 TRASH RECEPTACLES

- a. DuMor Trash Receptacle: Model 124-31PL, or approved equal. 'Cedar' recycled plastic slats, surface mount, 'Green' polyester powder-coat finish.
- b. Contact: Earl F. Andersen Company, Phone: 952-884-7300, Fax: 952-884-5619.

2.9 DRINKING FOUNTAINS

a. Most Dependable Fountains" Model Jug Filler DB, or approved equal. Direct embed mount, green polyester powder-coat finish. Contact: Most Dependable Fountains, Phone: 901-867-0039, Fax: 901-867-4008.

2.10 TELEPHONE ENCLOSURE

a. PBG Traditional Enclosure, or approved equal. Color shall be black; surface-mounted pedestal enclosure. Contact: PBG, Phone: 800-264-8888, Fax: 770-887-9511.

2.11 GRILLS

a. DuMor Dual Level Grill: Model #24, or approved equal. Surface mount. Contact: Earl F. Andersen Company, Phone: 952-884-7300, Fax: 952-884-5619.

2.12 SIGNS

a. Best Signs Custom Regulatory Signage, or approved equal. Contact: Paula, Construction Supply, Inc., Phone: 763-537-5018.

2.13 PICNIC SHELTERS

The shelter shall have custom masonry work on the columns and shall have pre-cut steel roof in "hunter green".

a. Small Shelter: Litchfield Industries: ;Steel Beam; Shelter (20' x 36'), Model: 2217, or approved equal. Contact: Litchfield Industries, Inc., Phone: 800-542-5282, Fax: 517-542-3939.

2.14 Kiosk Sign Cabinet

Hopewell Manufacturing: Bulletin case, or approved equal. 36 inches wide x 48 inches high frame sandblasted with clear finish. Custom mount vertical. Contact: Paul Kramer, Hopewell Manufacturing. Phone: 301-582-2343, fax: 301-582-2343.

PART 3 EXECUTION

3.1 INSTALLATION

The Contractor shall verify that finished grades and other operations affecting mounting surfaces have been completed prior to the installation of site furnishings. Site furnishings shall be installed plumb and true in accordance with the approved manufacturer's instructions.

3.1.1 Parts

New parts shall be acquired from the manufacturer. Substitute parts will not be accepted unless approved by the manufacturer.

3.1.2 Assembly

When the inspection of parts has been completed, the site furnishings shall be assembled and anchored according to manufacturer's instructions or as indicated. When site furnishings are assembled at the site, assembly shall not interfere with other operations or pedestrian and vehicular circulation.

3.1.3 Testing

Each site furnishing shall be tested to determine a secure and correct installation. A correct installation shall be according to the manufacturer's recommendations and by the following procedure: The Contractor shall measure the physical dimensions and clearance of each installed site furnishing for compliance with manufacturer's recommendations and as indicated. Site furnishings which do not comply shall be reinstalled. Fasteners and anchors determined to be non-compliant shall be replaced. A written report describing the results of the testing shall be provided.

3.2 RESTORATION AND CLEAN UP

When the installation has been completed, the Contractor shall clean up and protect the site. Existing areas that have been damaged from the installation operation shall be restored to original condition at Contractor's expense.

3.2.1 Clean Up

The site shall be cleaned of all materials associated with the installation. Site furnishing surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be according to manufacturer's instructions or as indicated.

3.2.2 Protection

The area shall be protected as required or directed by providing barricades and signage. Signage shall be in accordance with Section 10430 EXTERIOR SIGNAGE.

3.2.3 Disposal of Materials

Excess and waste material shall be removed and disposed off Government property.

3.3 RE-INSTALLATION

Where re-installation is required, the following shall be accomplished:

- a. Re-install the product as specified. Material acquisition of replacement parts is the responsibility of the Contractor. Provide replacement materials that are new and supplied by the original manufacturer to match.
- b. Damage caused by the failed installation shall be repaired.
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SECTION 02920

SEEDING, SODDING, AND TOPSOIL 06/02

PART 1 GENERAL

Wherever possible, all seed shall be drilled. Other seeding methods are subject to approval. Existing turf areas which have been damaged during the contract operations, and which are outside of the limits designated to be seeded, shall be restored following the requirements in this section, at no additional cost to the Government.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01 (Aug 95) Federal Seed Act Regulations Part

201

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4972 (1995a) pH of Soils

ASTM D 5268 (1992; R 1996) Topsoil Used for

Landscaping Purposes

AMERICAN SOD PRODUCERS ASSOCIATION, INC. (ASPA)

ASPA (1988) Guideline Specifications to Sodding

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) Standard Specifications for Construction (2000 EDITION AND SUPPLEMENTS)

MNDOT 3876 Seed

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Manufacturer's Literature; FIO.

The Contractor shall submit manufacturer's literature discussing physical characteristics, applications, guarantees, and installation of the seed, mulch, and fertilizer. The Contractor shall submit manufacturer's literature for equipment showing application and installation instructions.

SD-08 Statements

Experience for Native Grasses; FIO.

The Contractor shall submit a statement indicating that the work to establish the turf will be supervised by an individual with a minimum of 5 years experience with establishment and restoration of native plant communities.

SD-09 Reports

Soil Test; FIO.

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

Seed Test; FIO.

The Contractor shall submit test reports for a purity and germination test following the Association of Official Seed Analysts (AOSA) rules for each seed mixture. The test reports shall indicate the purity percentage, germination percentage, and amount of Pure Live Seed (PLS) per bag for each species.

Water Test; FIO

Water from sources other than municipal water supply shall be tested for salinity and pH.

SD-13 Certificates

Certificates of Compliance; FIO.

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

- a. Seed. Mixture percentage, percent pure live seed, percent germination, weed seed content, and date tested.
- b. Topsoil. Gradation, pH, organic matter content, textural class, soluble salts.
- d. Fertilizer. Chemical analysis and composition percent.
- e. Organic Material: Composition and source.
- g. Mulch: Composition and source.

SD-14 Samples

Samples; FIO

Samples shall be provided for the following:

- a. A 5 pound sample for each source of topsoil brought from off-site.
- b. A 2 pound sample for each type of soil amendment proposed for use.
- c. A 2 pound sample for each type of mulch proposed for use.

SD-18 Records

Quantity Check; FIO

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

Maintenance Record; FIO

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

Seed Order for Native Grasses; FIO

Contractor shall submit proof of seed order for native grass seed mixes as specified within this section within 30 days of notice to proceed.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed materials shall be delivered in manufacturer's original, unopened containers with labels and tags intact and legible. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.2 Storage

Materials shall be stored on-site in areas provided by the Contractor. The storage areas shall be made accessible to the Contracting Officer so that application rates can be verified. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall be stored according to manufacturer's instructions and not

with seed.

1.4.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.4 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

PART 2 PRODUCTS

2.1 SEED

Substitutions will not be allowed without written request and approval from the Contracting Officer. The mixing of seed may be done by the seed supplier prior to delivery, or on site in the presence of the Contracting Officer. Seed for native grass and forbe species shall be gathered from within 500 miles of the jobsite.

2.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for mixture percentage, purity, germination, weed seed content, and inert material. Labels shall be in conformance with AMS-01 and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures shall be provided as follows:

- 1) Class 1, MNDOT 60B Low Maintenance Turf
- 2) Class 2, MNDOT 30B Urban Prairie
- 3) Class 3, MNDOT 25B Prairie Sedge Meadow
- 4) Class 4, MNDOT 80B Moist Ditches

2.1.3 Quality

Weed seed shall be a maximum 1/2 of 1 percent by weight of the total mixture. Innoculent shall consist of the proper bacteria applied in the amount and manner recommended by the manufacturer to all legumes in the

seed mix.

2.2 SOD

Sod shall be nursery grown as classified in the ASPA Guideline Specifications to Sodding. Sod shall be 100% mineral sod. Sod grown in peat soils will not be accepted. Sod shall consist of at least 75% Kentucky Blue Grass (Poa pratensis). Acceptable varieties include park, newport, glade, nugget, touch down, rugby, and parade.

2.2.1 Quality

Sod shall be machine cut at a uniform soil thickness of 5/8 inch, plus or minus 1/4 inch, at the time of cutting. Measurement of thickness shall exclude top growth and thatch. Standard size sections of sod shall be strong enough that when grasped at one end, can be picked up and handled without damage. Sod shall not be harvested or transplanted when moisture content, either excessively dry or wet, may adversely affect its survival. Broken pads and pads with torn or uneven ends will not be accepted. The pieces of sod shall not vary more than 1/2 inch in width.

2.2.2 Harvesting

Before harvesting, the turf shall be moved uniformly at a height of 1 to 1-1/2 inches. Sod shall be harvested, delivered and transplanted within a period of 36 hours. Sod not transplanted within this time period shall not be installed without the inspection and approval of the Contracting Officer.

2.2.3 Delivery

Sod Pallets shall be sprinkled with water and covered with moist burlap, straw, or other approved covering and protected from exposure to wind and direct sunlight. Covering shall be such that air can circulate and heating will not develop.

2.3 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.4 SOIL AMENDMENTS

Soil amendments required under this contract consist of fertilizer.

2.4.1 Fertilizer

The nutrients ratio shall be 20 percent nitrogen, 20 percent phosphorus, and 20 percent potassium. Fertilizer shall be controlled release commercial grade, free flowing, and uniform in composition.

2.5 MULCH

2.5.1 Straw Mulch

Straw mulch materials shall consist of wheat, oat, or rye straw, hay, grass, or other plants approved by the Contracting Officer. Mulch materials shall be native to the region. The mulch material shall be air dry, reasonably light in color, and shall not be musty, moldy, caked, or otherwise of low quality. The mulch shall be seed free or fumigated to prevent introduction of weeds. The use of mulch that contains noxious weeds will not be accepted. Dry mulching material which breaks and does not bend is unacceptable. Mulch shall have a consistency for placing with commercial mulch blowing equipment.

2.6 WATER

Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

PART 3 EXECUTION

3.1 TURF PLANTING LOCATIONS, TIMES, AND CONDITIONS

3.1.1 Notification

The Contractor shall notify the Contracting Officer 24 hours in advance of beginning seeding, sodding, or any changes in turf establishment operations.

3.1.2 Seed Locations

Seed shall be planted in locations indicated on the drawings.

3.1.3 Rates of Seeding

Seed shall be applied at the rates listed below:

Seed Rates

Application Rate
(pounds per acre)
100
60
30
50

3.1.4 Seeding Time

Seed shall be planted within the dates specified below. No finished construction area shall be left untopsoiled and unseeded during the winter months. When substantially complete areas are not seeded within the specified seeding times for fall planting, a temporary winter cover shall be placed. Temporary winter cover shall be oats. Rate of seeding for oats as winter cover shall be 80 pounds per acre.

Seeding Time

Seed Mixture		Spr	ring			Fall	
Class 1 (MNDC	T 60B)	April 1	to June	1	July	20 to	Sept.20
Class 2 (MNDC	T 30B)	April 15	to July	20	Sept.	20 to	Oct. 20
Class 3 (MNDC	T 25B)	April 15	to July	20	Sept.	20 to	Oct. 20
Class 4 (MNDC	T 80B)	April 1	to Sept	1			

3.1.5 Sod Locations

Sod shall be placed in locations indicated and on any disturbed areas outside of the limits of work.

3.1.6 Planting Conditions

Seeding and sodding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding and sodding operations, proposed alternate times shall be submitted for approval.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed prior to the commencement of the seeding operation. All vegetation, including live roots, shall be completely removed or treated with herbicide prior to spreading topsoil or placing sod.

3.2.2 Spreading Topsoil

Topsoil shall be distributed and spread uniformly to one half the thickness shown on the plans and tilled to a depth of 2 inches into the subgrade. The remaining half of the topsoil shall then be placed. Surface irregularities resulting from topsoiling or other operations shall be leveled to prevent depressions.

3.2.2.1 Equipment

Topsoil shall be spread using a bladed dozer having ground pressure less than 4.5 psi and operating weight less than 35,000 pounds, or with rubber tired equipment having operating weight less than 10,000 pounds. The work shall be coordinated such that equipment for hauling the topsoil does not travel over the topsoil in place. Areas compacted by construction operations shall be completely pulverized by tillage.

3.2.2.2 Stripped Materials.

Topsoil obtained from stripping operations shall be kept separate from other unusable excavated materials, brush, litter, objectionable weeds,

roots, stones, and other materials that would interfere with planting and maintenance operations. Unusable material shall be removed and properly disposed of.

3.2.3 Tillage

Topsoil on slopes up to a maximum 3H:1V slope shall be tilled to a nominal 3 inch depth by plowing, disking, harrowing, rototilling or other approved method. On slopes between 3H:1V and 1:1, the soil shall be tilled to a minimum 2 inch depth by scarifying with heavy rakes, or other method.

3.2.4 Prepared Surface

The prepared surface shall be 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris. Debris and stones over a minimum 1-1/2 inches in any dimension shall be removed from the surface. Drainage patterns shall be maintained as indicated on drawings. Tolerance for prepared surfaces shall be within 1 inch of the plan elevation. The prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.3 SEEDING

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.1 Equipment

Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved.

3.3.2 Broadcast Seeding

In areas inaccessible to drill seeding, seed shall be broadcast by hand. Seed shall be uniformly broadcast at the rate specified for the mix. Half the total rate of seed application shall be sown with sower moving in one direction, and the remainder with sower moving at right angles to first sowing. Seed shall be covered a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device. Seed shall not be broadcast when wind speed exceeds 5 miles per hour.

3.3.3 Drill Seeding

Seed shall be uniformly drilled to a depth of 1/2 to 3/4 inches at the rate specified for the mix. Equipment shall have drills a maximum 6 inches distance apart. Row markers shall be used with the drill seeder. Seed shall be drilled in two directions, applying approximately half the seed in each direction. The drilling equipment shall be maintained with half full seed boxes during the seeding operations. When slopes exceed 1 vertical on 5 horizontal, baffle plates spaced not more than 6 inches apart shall be

installed in the seed box.

3.3.4 Hydroseeding (Optional)

The hydroseeding operation shall apply the seed, mulch, and fertilizer simultaneously. The seed shall be applied at the rate indicated in the Seed Mixture Table. The fertilizer shall be applied at a rate proposed by the Contractor and agreed to by the Contracting Officer. The mulch shall be applied at a rate of about 1 ton per acre. During application, the spray shall be directed to obtain a uniform material distribution as evidenced by a formation of a "blotter-like" cover, with about 5% void area. The mulch shall permit percolation of water to the underlying soil. The seed mixed with water and fertilizer shall be applied within 1 hour after adding to the tank.

3.3.5 Mulching

3.3.5.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre, except as modified for native grasses. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.3.5.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.3.6 Initial Watering

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 3 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed by Contracting Officer.

3.3.7 Native Grasses

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Areas seeded with native grasses, except slopes steeper than 3H:1V, shall be firmed with a roller not exceeding 90 pounds per foot roller width. Seed drills equipped with rollers are acceptable.

3.4 SODDING

3.4.1 Placement

Sod shall be carefully placed with the first row laid in a straight line and subsequent rows placed parallel to and abutted tightly against each other. Sod shall be placed with staggered end joints and without stretching or overlapping. On slope areas sodding shall be started at the bottom of the slope. On 1:3 or steeper slopes, sod shall be laid across the angle of the slope and secured by tamping, pegging or other approved methods of temporarily securing each piece. In areas where concentrated flow of water is expected, sod shall be laid at right angles to the flow. After the sodding operation has been completed, the edges of the sodded area shall blend smoothly into the surrounding area.

3.4.2 Rolling and Watering

After completion of the sod placement in each area, the Contractor shall water the sod immediately, and the entire area shall be lightly rolled. The sod shall be watered to a depth sufficient such that the underside of the sod pad and the soil immediately below the pad are thoroughly wet. Watering operations shall be properly supervised to prevent run-off. The Contractor shall arrange for an adequate water supply and all equipment necessary for water application shall be supplied including all pumps, hoses, pipelines, and sprinkling equipment until final acceptance is made.

3.5 RESTORATION AND CLEAN UP

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades, providing signage, or as directed by Contracting Officer. Existing turf areas, pavements, riprap areas and other project features that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense. Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

3.6 MAINTENANCE

3.6.1 Maintenance Watering

The Contractor shall be responsible for watering after planting to promote adequate growth and development. Water shall be distributed with equipment that does not erode or disturb the mulch. If the grass wilts, or if the soil becomes crusted and desiccated during germination, the Contracting Officer may direct watering. Watering directed by the Contracting Officer shall be performed within 48 hours after notice by the Contracting Officer to the Contractor; and shall place about 10,000 gallons per acre.

3.6.2 Mowing

a. Bluegrass predominant seed mixes: Mowing shall be done as needed to maintain lawn areas at a nominal height of 3 inches until final acceptance, except not more than 1/3 of the grass leaf shall be removed by the initial cutting. Clippings shall be removed when the amount of cut turf is heavy enough to damage the turfed areas. Seeded areas shall be mowed immediately prior to final inspection.

b. Native Grasses: Areas seeded with native grasses shall be mowed during the first growing season to control pioneering weeds and other competition. For the purposes of this project a weed is defined as any plant not included in the seed mix. Mowing should be done before the general height is 6 to 10 inches, or when the weedy foliar cover reaches 50 percent of the seeded area, or when the weed species begin to flower. The first mowing shall be set at a height of 3 inches with the following mowings to be set at a height of 4 to 8 inches. Rotary, flail, or sickle bar type mowing equipment is acceptable.

3.6.3 General Maintenance

Maintenance of the seeded areas shall include eradicating weeds, protecting embankments and ditches from surface erosion, maintaining erosion control materials and mulch, protecting installed areas from traffic, mowing, watering, and post-fertilization. If any portion of the surface becomes rilled, gullied, damaged, or destroyed, that portion shall be repaired to re-establish the area without additional cost to the government. The Contractor shall control erosion during the maintenance period by using ditch checks, sod swales, silt fences or other methods until a proper stand of turf is established.

3.6.3.1 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be properly filled. Mulch material that has been removed by wind or other causes shall be replaced and secured. Maintenance shall include protecting embankments and ditches from erosion and maintaining erosion control material.

3.6.4 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

3.7 EVALUATION AND ACCEPTANCE

Turf establishment after seeding shall extend for 12 months after completion of the seeding on the entire project, unless desired growth is established, and shortening the period of the Contractor's responsibility for acceptably established areas is authorized by the Contracting Officer. Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch high.

- a. Bluegrass predominant seed mixes. A stand of turf is defined as a uniform stand of grass that is at least 2 inches tall with a minimum of 100 grass plants per square foot and reasonably free of weeds and visual imperfections as assessed by the Contracting Officer.
- b. Native Grasses. A proper stand of turf from the seeding of native grasses is defined as a minimum of 10 plants per square

foot and where no gaps larger than 6 inches in diameter occur anywhere in the turfed area. Only plants specified in the seed mix table will be considered.

3.8 SURFACE EROSION CONTROL

Where directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material and deviation to finished grade. When directed by Contracting Officer and during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded with a temporary seed crop.

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SECTION 02930

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SECTION 02930

EXTERIOR PLANTING 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NURSERY AND LANDSCAPE ASSOCIATION (ANLA)

ANLA ANSI/ANLA Z60.1 (1996) Nursery Stock

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A300 (1995) Tree Care Operations - Trees, Shrubs and other Woody Plant Maintenance

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602	(1995a) Agricultural Liming Materials
ASTM D 4972	(1995a) pH of Soils
ASTM D 5034	(1995) Breaking Strength and Elongation of Textile Fabrics (Grab Test)
ASTM D 5035	(1995) Breaking Strength and Elongation of Textile Fabrics (Grab Test)
ASTM D 5268	(1992; R1996) Topsoil Used for Landscaping Purposes
ASTM D 5883	(1996) Standard Guide for Use of Rotary Kiln Produced Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 2571 Plant Installation

MNDOT 3882 Mulch

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals not having a "GA" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Geotextile; GA. Chemical Treatment Material; GA.

Manufacturer's literature including physical characteristics, application and installation instructions for geotextile and chemical treatment material.

SD-08 Statements

Delivery; GA.

Delivery schedule.

Finished Grade, Topsoil and Underground Utilities; GA.

Finished grade status; location of underground utilities and facilities; and availability of topsoil from the stripping and stock piling operation.

SD-09 Reports

Soil Test; GA. Percolation Test; GA.

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-13 Certificates

Plant Material; GA. Topsoil; GA. Organic Material; GA. Organic Mulch; GA. Pesticide; GA.

Prior to delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following.

- a. Plant Material: Classification, botanical name, common name, size, quantity by species, and location where grown.
- b. Topsoil: Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.
- c. Organic Material: Composition and source.
- d. Organic Mulch: Composition, source, and treatment against fungi growth.

SD-14 Samples

Delivered Topsoil; GA.

Samples taken from several locations at the source.

Mulch; GA.

A 10 pound sample.

SD-18 Records

Plant Establishment Period; GA.

Calendar time period for the plant establishment period. When there is more than one establishment period, the boundaries of the planted areas covered for each period shall be described.

Maintenance Record; GA.

Maintenance work performed, quantity of plant losses, and replacements; and diagnosis of unhealthy plant material.

Application of Pesticide; GA.

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

SD-19 Operation and Maintenance Manuals

Maintenance Instructions; GA.

Instruction for year-round care of installed plant material.

1.3 SOURCE INSPECTIONS

The nursery or source of plant material and the source of delivered topsoil shall be subject to inspection.

- 1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING
- 1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Plant Material Identification

Plant material shall be identified with attached, durable, waterproof

labels and weather-resistant ink, stating the correct botanical plant name and size.

1.4.1.2 Protection During Delivery

Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball. Branches shall be protected by tying-in. Exposed branches shall be covered during transport.

1.4.1.3 Delivered Topsoil

Prior to the delivery of any topsoil, the availability of topsoil shall be verified in paragraph TOPSOIL. A soil test shall be provided for delivered topsoil.

1.4.1.4 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.4.1.5 Pesticide Material

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the Environmental Protection Agency (EPA) registration number and the manufacturer's registered uses.

1.4.2 Inspection

Plant material shall be well shaped, vigorous and healthy with a healthy, well branched root system, free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement or abrasion. Plant material shall be checked for unauthorized substitution and to establish nursery grown status. Plant material showing desiccation, abrasion, sun-scald injury, disfigurement, or unauthorized substitution shall be rejected. The plant material shall exhibit typical form of branch to height ratio; and meet the caliper and height measurements specified. Plant material that measures less than specified, or has been poled, topped off or headed back, shall be rejected. Container-grown plant material shall show new fibrous roots and the root mass shall contain its shape when removed from the container. Plant material with broken or cracked balls; or broken containers shall be rejected. Bare-root plant material that is not dormant or is showing roots were pulled from the ground shall be rejected. Other materials shall be inspected for compliance with paragraph PRODUCTS. Open soil amendment containers or wet soil amendments shall be rejected. Topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material larger than 1-1/2 inch diameter shall be rejected. Topsoil that contains viable plant material and plant parts shall be rejected. Unacceptable material shall be removed from the job site.

1.4.3 Storage

1.4.3.1 Plant Material Storage

Plant material not installed on the day of arrival at the site shall be stored and protected in designated areas. Plant material shall not be stored longer than 30 days. Plant material shall be protected from direct exposure to wind and sun. Bare-root plant material shall be heeled-in. All plant material shall be kept in a moist condition by watering with a fine mist spray until installed.

1.4.3.2 Other Material Storage

Storage of other material shall be in designated areas. Soil amendments shall be stored in dry locations and away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with planting operation material.

1.4.4 Handling

Plant material shall not be injured in handling. Cracking or breaking the earth ball of balled and burlapped plant material shall be avoided. Plant material shall not be handled by the trunk or stems. Materials shall not be dropped from vehicles.

1.4.5 Time Limitation

Except for container-grown plant material, the time limitation from digging to installing plant material shall be a maximum 90 days. The time limitation between installing the plant material and placing the mulch shall be a maximum 24 hours.

1.5 WARRANTY

Furnished plant material shall have a warranty for plant growth to be in a vigorous growing condition for a minimum 12 month period. A minimum 12 month calendar time period for the warranty of plant growth shall be provided regardless of the contract time period. When plant material is determined to be unhealthy in accordance with paragraph PLANT ESTABLISHMENT PERIOD, it shall be replaced once under this warranty.

PART 2 PRODUCTS

2.1 PLANT MATERIAL

2.1.1 Plant Material Classification

The plant material shall be nursery grown stock conforming to ANLA ANSI/ANLA Z60.1 and shall be the species specified.

2.1.2 Plant Schedule

The plant schedule shall provide botanical names as included in one or more of the publications listed under "Nomenclature" in ANLA ANSI/ANLA Z60.1.

2.1.3 Substitutions

Substitutions will not be permitted without written request and approval from the Contracting Officer.

2.1.4 Quality

Well shaped, well grown, vigorous plant material having healthy and well branched root systems in accordance with ANLA ANSI/ANLA Z60.1 shall be provided. Plant material shall be provided free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement and abrasion. Plant material shall be free of shock or damage to branches, trunk, or root systems, which may occur from the digging and preparation for shipment, method of shipment, or shipment. Plant quality is determined by the growing conditions; method of shipment to maintain health of the root system; and growth of the trunk and crown as follows.

2.1.5 Growing Conditions

Plant material shall be native to or well-suited to the growing conditions of the project site. Plant material shall be grown under climatic conditions similar to those at the project site.

2.1.6 Method of Shipment to Maintain Health of Root System

2.1.6.1 Balled and Burlapped (BB) Plant Material

Ball size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding root system necessary for the full recovery of the plant. The plant stem or trunk shall be centered in the ball. All roots shall be clean cut at the ball surface. Roots shall not be pulled from the ground. Before shipment the root ball shall be dipped in gels containing mycorrhizal fungi inoculum. The root ball shall be completely wrapped with burlap or other suitable material and securely laced with biodegradable twine.

2.1.6.2 Balled and Potted (Pot) Plant Material

Ball size and ratio shall be in accordance with ANLA ANSI/ANLA Z60.1. The ball shall be of a diameter and depth to encompass enough fibrous and feeding root system necessary for the full recovery of the plant. Removal shall be done by hand digging or mechanical devices. The plant stem or trunk shall be centered in the ball. All roots shall be clean cut at the ball surface. Roots shall not be pulled from the ground. Before shipment the root ball shall be dipped in gels containing mycorrhizal fungi inoculum. Container shall be used to retain the ball unbroken. Container shall be rigid to hold ball shape and protect root mass during shipping.

2.1.6.3 Container-Grown (C) Plant Material

Container size shall be in accordance with ANLA ANSI/ANLA Z60.1. Plant material shall be grown in a container over a duration of time for new fibrous roots to have developed and for the root mass to retain its shape and hold together when removed from the container. Container-grown plant

material shall be inoculated with mycorrhizal fungi during germination in the nursery. Before shipment the root system shall be dipped in gels containing mycorrhizal fungi inoculum. The container shall be sufficiently rigid to hold ball shape and protect root mass during shipping.

2.1.7 Growth of Trunk and Crown

2.1.7.1 Deciduous Trees

A height to caliper relationship shall be provided in accordance with ANLA ANSI/ANLA Z60.1. Height of branching shall bear a relationship to the size and species of tree specified and with the crown in good balance with the trunk. The trees shall not be "poled" or the leader removed.

- a. Single stem: The trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.
- b. Multi-stem: All countable stems, in aggregate, shall average the size specified. To be considered a stem, there shall be no division of the trunk which branches more than 6 inches from ground level.
- c. Specimen: The tree provided shall be well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be as indicated.

2.1.7.2 Deciduous Shrubs

Deciduous shrubs shall have the height and number of primary stems recommended by ANLA ANSI/ANLA Z60.1. Acceptable plant material shall be well shaped, with sufficient well-spaced side branches, and recognized by the trade as typical for the species grown in the region of the project.

2.1.7.3 Coniferous Evergreen Plant Material

Coniferous Evergreen plant material shall have the height-to-spread ratio recommended by ANLA ANSI/ANLA Z60.1. The coniferous evergreen trees shall not be "poled" or the leader removed. Acceptable plant material shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

2.1.7.4 Broadleaf Evergreen Plant Material

Broadleaf evergreen plant material shall have the height-to-spread ratio recommended by ANLA ANSI/ANLA Z60.1. Acceptable plant material shall be well shaped and recognized by the trade as typical for the variety grown in the region of the project.

2.1.7.5 Ground Cover and Vine Plant Material

Ground cover and vine plant material shall have the minimum number of runners and length of runner recommended by ANLA ANSI/ANLA Z60.1. Plant material shall have heavy, well developed and balanced crown with vigorous,

well developed root system and shall be furnished in containers.

2.1.8 Plant Material Size

Plant material shall be furnished in sizes indicated. Plant material larger in size than specified may be provided at no additional cost to the Government.

2.1.9 Plant Material Measurement

Plant material measurements shall be in accordance with ANLA ANSI/ANLA Z60.1.

2.2 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with Section 02300 EARTHWORK. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the plant material specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.3 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material and soil conditioners meeting the following requirements. Vermiculite is not recommended.

2.3.1 pH Adjuster

The pH adjuster shall be an agricultural liming material in accordance with ASTM C 602. These materials may be burnt lime, hydrated lime, ground limestone, or shells. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

2.3.1.1 Limestone

Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.

2.3.1.2 Hydrated Lime

Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. Gradation: A minimum 100 percent shall pass through a No. 8 sieve and a minimum 97 percent shall pass through a No. 60 sieve.

2.3.1.3 Burnt Lime

Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. Gradation: A minimum 95 percent shall pass through a No. 8

sieve and a minimum 35 percent shall pass through a No. 60 sieve.

2.3.2 Organic Material

Organic material shall consist of either bonemeal, peat, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

2.3.2.1 Bonemeal

Bonemeal shall be a finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

2.3.2.2 Rotted Manure

Rotted manure shall be unleached horse, chicken, or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials. Manure shall contain no chemicals or ingredients harmful to plants. The manure shall be heat treated to kill weed seeds and shall be free of stones, sticks, and soil.

2.3.2.3 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. It shall be derived from food, agricultural, or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have a moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent or less by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length.

2.3.2.4 Worm Castings

Worm castings shall be screened from worms and food source and shall be commercially packaged.

2.3.3 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for single use or in combination to meet topsoil requirements for the plant material specified.

2.3.3.1 Sand

Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Greensand shall be balanced with the inclusion of trace minerals and nutrients.

2.3.3.2 Super Absorbent Polymers

To improve water retention in soils, super absorbent polymers shall be sized according to manufacturer's recommendations. Polymers shall be added as a soil amendment and be cross-linked polyacrylamide with an absorption capacity of 250-400 times its weight.

2.3.3.3 Calcined Clay

Granular particles shall be produced from montmorillonite clay calcined to minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent passing No. 8 sieve; a minimum 99 percent shall be retained on No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.3.3.4 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.

2.3.3.5 Expanded Shale, Clay, or Slate (ESCS)

Rotary kiln produced ESCS material shall be in conformance with ASTM D 5883.

2.4 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Rotted manure is not recommended to be used as a mulch because it would encourage surface rooting of the plant material and weeds.

2.4.1 Organic Mulch

Organic mulch materials shall be native to the project site and consist of recycled mulch, shredded bark, wood chips, or ground bark.

2.4.1.1 Shredded Bark

Locally shredded material shall be treated to retard the growth of mold and fungi.

2.4.1.2 Wood Chips and Ground Bark

Locally chipped or ground material shall be treated to retard the growth of mold and fungi. Gradation: A maximum 2 inch wide by 4 inch long.

2.5 WOOD STAKING MATERIAL

Wood stakes shall be hardwood or fir; rough sawn; free from knots, rot, cross grain, or other defects that would impair their strength.

2.5.1 Bracing Stake

Wood bracing stakes shall be a minimum 2×2 inch square and a minimum 8 feet long with a point at one end. Stake shall be set without damaging rootball.

2.5.2 Wood Ground Stakes

Wood ground stakes shall be a minimum of 2×2 inch square and a minimum 3 feet long with a point at one end.

2.6 METAL STAKING AND GUYING MATERIAL

Metal shall be aluminum or steel consisting of recycled content made for holding plant material in place.

2.6.1 Bracing Stakes

Metal bracing stakes shall be a minimum 1 inch diameter and a minimum 8 feet long. Stake shall be set without damaging rootball.

2.6.2 Metal Ground Stakes

Metal ground stakes shall be a minimum 1/2 inch diameter and a minimum 3 feet long.

2.6.3 Earth Anchor

Metal earth anchors shall be a minimum 1/2 inch diameter and a minimum 2 feet long.

2.6.4 Guying Material

Metal guying material shall be a minimum 12 gauge wire. Multi-strand cable shall be woven wire. Guying material tensile strength shall conform to the size of tree to be held firmly in place.

2.6.5 Turnbuckle

Metal turnbuckles shall be galvanized or cadmium-plated steel, and shall be a minimum 3 inches long with closed screw eyes on each end. Screw thread tensile strength shall conform to the size of tree to be held firmly in place.

2.7 RUBBER GUYING MATERIAL

Rubber chafing guards, consisting of recycled material, shall be used to protect tree trunks and branches when metal guying material is applied. The material shall be the same color throughout the project. Length shall be a minimum 1.5 times the circumference of the plant trunk at its base.

2.8 FLAG

Plastic flag material shall be used on guying material. It shall be a minimum 6 inches long. Tape color shall be consistent and visually complimentary to the entire project area. The tape color shall meet pedestrian visual safety requirements for day and night.

2.9 WATER

Unless otherwise directed, water shall be the responsibility of the Contractor. Water shall not contain elements toxic to plant life.

2.10 PESTICIDE

Pesticide shall be insecticide, herbicide, fungicide, nematocide, rodenticide or miticide. For the purpose of this specification a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved.

PART 3 EXECUTION

3.1 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

3.1.1 Deciduous Plant Material Time

Deciduous plant material shall be installed from April 21 to June 1 for Spring planting and from October 1 to November 1 for Fall planting.

3.1.2 Evergreen Plant Material Time

Evergreen plant material shall be installed from April 21 to June 1 for Spring planting and from August 25 to September 15 for Fall planting.

3.1.3 Plant Material Conditions

Planting operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, frozen ground or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted for approval.

3.1.4 Tests

3.1.4.1 Percolation Test

Test for percolation shall be done to determine positive drainage of plant pits and beds. A positive percolation shall consist of a minimum 1 inch per 3 hours; when a negative percolation test occurs, a shop drawing shall be submitted indicating the corrective measures.

3.2 SITE PREPARATION

3.2.1 Finished Grade, Topsoil and Underground Utilities

The Contractor shall verify that finished grades are as indicated on drawings, and that the placing of topsoil, the smooth grading, and the compaction requirements have been completed in accordance with Section 02300 EARTHWORK, prior to the commencement of the planting operation. The location of underground utilities and facilities in the area of the planting operation shall be verified. Damage to underground utilities and facilities shall be repaired at the Contractor's expense.

3.2.2 Layout

Plant material locations and bed outlines shall be staked on the project site before any excavation is made. Plant material locations may be adjusted to meet field conditions.

3.2.3 Protecting Existing Vegetation

When there are established lawns in the planting area, the turf shall be covered and/or protected during planting operations. Existing trees, shrubs, and plant beds that are to be preserved shall be barricaded along the dripline to protect them during planting operations.

3.3 EXCAVATION

3.3.1 Obstructions Below Ground

When obstructions below ground affect the work, shop drawings showing proposed adjustments to plant material location, type of plant and planting method shall be submitted for approval.

3.3.2 Turf Removal

Where the planting operation occurs in an existing lawn area, the turf shall be removed from the excavation area to a depth that will ensure the removal of the entire root system.

3.3.3 Plant Pits

Plant pits for ball and burlapped or container plant material shall be dug to a depth equal to the height of the root ball as measured from the base of the ball to the base of the plant trunk. Plant pits shall be dug a minimum 50 percent wider than the ball or root system to allow for root expansion. The pit shall be constructed with sides sloping towards the base as a cone, to encourage well aerated soil to be available to the root system for favorable root growth. Cylindrical pits with vertical sides shall not be used.

3.4 INSTALLATION

3.4.1 Setting Plant Material

Plant material shall be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. In relation to the surrounding grade, the plant material shall be set even with the grade at which it was grown.

3.4.2 Backfill Soil Mixture

The backfill soil mixture may be a mix of topsoil and soil amendments suitable for the plant material specified. When practical, the excavated soil from the plant pit that is not amended provides the best backfill and shall be used.

3.4.3 Backfill Procedure

Prior to backfilling, all metal, wood, synthetic products, or treated burlap devices shall be removed from the ball or root system avoiding damage to the root system. The backfill procedure shall remove air pockets from around the root system. Additional requirements are as follows.

3.4.3.1 Balled and Burlapped, and Balled and Platformed Plant Material

Biodegradable burlap and tying material shall be carefully opened and folded back from the top a minimum 1/3 depth from the top of the root ball. Backfill mixture shall be added to the plant pit in 6 inch layers with each layer tamped.

3.4.3.2 Container-Grown and Balled and Potted Plant Material

The plant material shall be carefully removed from containers that are not biodegradeable. Prior to setting the plant in the pit, a maximum 1/4 depth of the root mass, measured from the bottom, shall be spread apart to promote new root growth. For plant material in biodegradable containers the container shall be split prior to setting the plant with container. Backfill mixture shall be added to the plant pit in 6 inch layers with each layer tamped.

3.4.3.3 Earth Berm

An earth berm, consisting of backfill soil mixture, shall be formed with a minimum 4 inch height around the edge of the plant pit to aid in water retention and to provide soil for settling adjustments.

3.4.4 Plant Bed

Plant material shall be set in plant beds according to the drawings. Backfill soil mixture shall be placed on previously scarified subsoil to completely surround the root balls, and shall be brought to a smooth and even surface, blending to existing areas. Earth berms shall be provided. Polymers shall be spread uniformly over the plant bed and in the planting pit as recommended by the manufacturer and thoroughly incorporated into the soil to a maximum 4 inch depth.

3.4.5 Watering

Plant pits and plant beds shall be watered immediately after backfilling, until completely saturated.

3.4.6 Staking and Guying

Staking will be required when trees are unstable or will not remain set due to their size, shape, or exposure to high wind velocity.

3.4.6.1 Three Ground Stakes

Trees over a minimum 8 feet height and less than a maximum 6 inch caliper

shall be held firmly in place with 3 bracing or ground stakes spaced equidistantly around the tree. Ground stakes shall be avoided in areas to be mowed. Stakes shall be driven into firm ground outside the earth berm. The guying material shall be firmly anchored at a minimum 1/2 tree height and shall prevent girdling. For trees over maximum 3 inch diameter at breast height, turnbuckles shall be used on the guying material for tree straightening purposes. One turnbuckle shall be centered on each guy line. Chafing guards shall be used when metal is the guying material. Stake only at the direction of the Contracting Officer's Representative.

3.4.7 Flags

A flag shall be securely fastened to each guy line equidistant between the tree and the stake, deadmen, or earth anchor. The flag shall be visible to pedestrians.

3.5 FINISHING

3.5.1 Plant Material

Prior to placing mulch, the installed area shall be uniformly edged to provide a clear division line between the planted area and the adjacent turf area, shaped as indicated. The installed area shall be raked and smoothed while maintaining the earth berms.

3.5.2 Placing Mulch

The placement of mulch shall occur a maximum 48 hours after planting. Mulch, used to reduce soil water loss, regulate soil temperature and prevent weed growth, shall be spread to cover the installed area with a minimum 4 inch uniform thickness. Mulch shall be kept out of the crowns of shrubs, ground cover, and vines and shall be kept off buildings, sidewalks and other facilities.

3.5.3 Pruning

Pruning shall be accomplished by trained and experienced personnel. The pruning of trees and palms shall be in accordance with ANSI A300. Only dead or broken material shall be pruned from installed plants. The typical growth habit of individual plant material shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead and broken branches shall be removed. "Headback" cuts at right angles to the line of growth will not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off".

3.6 MAINTENANCE DURING PLANTING OPERATION

Installed plant material shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed to prevent desiccation and shall continue until the plant establishment period commences. Installed areas shall be kept free of weeds, grass, and other undesired vegetation. The maintenance includes maintaining the mulch, watering, and adjusting settling.

3.7 APPLICATION OF PESTICIDE

When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted and coordinated with the installation pest management program.

3.7.1 Technical Representative

The certified installation pest management coordinator shall be the technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.

3.7.2 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately.

3.8 RESTORATION AND CLEAN UP

3.8.1 Restoration

Turf areas, pavements and facilities that have been damaged from the planting operation shall be restored to original condition at the Contractor's expense.

3.8.2 Clean Up

Excess and waste material shall be removed from the installed area and shall be disposed offsite. Adjacent paved areas shall be cleared.

3.9 PLANT ESTABLISHMENT PERIOD

3.9.1 Commencement

Upon completion of the last day of the planting operation, the plant establishment period for maintaining installed plant material in a healthy growing condition shall commence and shall be in effect for the remaining contract time period, not to exceed 12 months. Written calendar time period shall be furnished for the plant establishment period. When there is more than one plant establishment period, the boundaries of the planted area covered for each period shall be described. The plant establishment period shall be coordinated with Sections 02920 SEEDING, SODDING, and TOPSOIL. The plant establishment period shall be modified for inclement weather shut down periods, or for separate completion dates for areas.

3.9.2 Maintenance During Establishment Period

Maintenance of plant material shall include straightening plant material, straightening stakes; tightening guying material; correcting girdling; supplementing mulch; pruning dead or broken branch tips; maintaining plant material labels; watering; eradicating weeds, insects and disease; post-fertilization; and removing and replacing unhealthy plants.

3.9.2.1 Watering Plant Material

The plant material shall be watered as necessary to prevent desiccation and to maintain an adequate supply of moisture within the root zone. An adequate supply of moisture is estimated to be the equivalent of 1 inch absorbed water per week, delivered in the form of rain or augmented by watering. Run-off, puddling and wilting shall be prevented. Unless otherwise directed, watering trucks shall not be driven over turf areas. Watering of other adjacent areas or existing plant material shall be prevented.

3.9.2.2 Weeding

Grass and weeds in the installed areas shall not be allowed to reach a maximum 3 inches height before being completely removed, including the root system.

3.9.2.3 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.

3.9.2.4 Post-Fertilization

The plant material shall be topdressed at least once during the period of establishment with controlled release fertilizer, reference paragraph SOIL AMENDMENTS. Apply at the rate of 2 pounds per 100 square feet of plant pit or bed area. Dry fertilizer adhering to plants shall be flushed off. The application shall be timed prior to the advent of winter dormancy.

3.9.2.5 Plant Pit Settling

When settling occurs to the backfill soil mixture, additional backfill soil shall be added to the plant pit or plant bed until the backfill level is equal to the surrounding grade. Serious settling that affects the setting of the plant in relation to the maximum depth at which it was grown requires replanting in accordance with paragraph INSTALLATION. The earth berm shall be maintained.

3.9.2.6 Maintenance Record

A record shall be furnished describing the maintenance work performed, the quantity of plant losses, diagnosis of the plant loss, and the quantity of replacements made on each site visit.

3.9.3 Unhealthy Plant Material

A tree shall be considered unhealthy or dead when the main leader has died back, or up to a maximum 25 percent of the crown has died. A shrub shall be considered unhealthy or dead when up to a maximum 25 percent of the plant has died. This condition shall be determined by scraping on a branch an area 1/16 inch square, maximum, to determine if there is a green cambium layer below the bark. The Contractor shall determine the cause for unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be removed immediately and shall be replaced as soon as seasonal conditions permit.

3.9.4 Replacement Plant Material

Unless otherwise directed, plant material shall be provided for replacement in accordance with paragraph PLANT MATERIAL. Replacement plant material shall be installed in accordance with paragraph INSTALLATION, and recommendations in paragraph PLANT ESTABLISHMENT PERIOD. Plant material shall be replaced in accordance with paragraph WARRANTY. An extended plant establishment period shall not be required for replacement plant material.

3.9.5 Maintenance Instructions

Written instructions shall be furnished containing drawings and other necessary information for year-round care of the installed plant material; including, when and where maintenance should occur, and the procedures for plant material replacement,.

-- End of Section --

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SECTION 02935

EXTERIOR PLANT MATERIAL MAINTENANCE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A300 (1995) Tree Care Operations - Trees, Shrubs and other Woody Plant Maintenance

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602 (1995a) Agricultural Liming Materials

ASTM D 4972 (1995a) pH of Soils

ASTM D 5883 (1996) Use of Rotary Kiln Produced

Expanded Shale, Clay or Slate (ESCS) as a Mineral Amendment in Topsoil Used for Landscaping and Related Purposes

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT), STANDARD SPECIFICATIONS FOR CONSTRUCTION (2000 EDITION AND SUPPLEMENTS)

MNDOT 2571 Plant Installation

MNDOT 3882 Mulch

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "GA" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-08 Statements

Work Plan and Schedule; GA.

Contractor's work plan and schedule.

Maintenance Record; GA.

Contractor's record of each site visit.

Contractor's record of each site visit; FIO

SD-09 Reports

Soil Test; GA. Percolation Test; GA.

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

1.3 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.3.1 Delivery Schedule

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.3.2 Storage

Materials shall be stored in designated areas. Lime and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.3.3 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

PART 2 PRODUCTS

2.1 MULCH

Mulch shall be shredded hard wood mulch per MNDOT 3882, Type 6 modified. Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region. Rotted manure shall not be used.

2.2 WATER

Water shall be the responsibility of the Contractor.

PART 3 EXECUTION

3.1 MULCHING

Mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.2 WATERING

Water to supplement rainfall shall be applied at a rate sufficient to ensure plant growth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

3.3 GENERAL MAINTENANCE REQUIREMENTS

3.3.1 Maintenance Record

A record of each site visit shall be furnished, describing:

- a. Maintenance work performed.
- b. Areas repaired or reinstalled.
- c. Diagnosis for unsatisfactory stand of grass.
- d. Diagnosis for unsatisfactory stand of plant material in planting bed.
- e. Condition of trees.
- f. Condition of shrubs.
- g. Quantity and diagnosis of plant loss.
- h. Irrigation of system.

3.4 GRASS PLANT QUALITY

Grass plants shall be evaluated for species and health when the grass plants are a minimum 2 inches high. The living grass area shall be maintained to be uniform in color and leaf texture; and free from weeds and other undesirable growth. The living grass area shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 1 inch in diameter, woody plant roots, and other materials detrimental to a healthy stand of grass plants. Broadleaf weeds and patches of foreign grasses shall be a maximum 2 percent of the total area.

3.4.1 Lawn Area

A satisfactory stand of grass plants for a lawn area shall be a minimum 100 grass plants per square foot. Bare spots shall be a maximum 6 inches square. The total bare spots shall be a maximum 2 percent of the total area.

3.4.2 Field Area

A satisfactory stand of grass plants for a field area shall be a minimum 10 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.

3.5 LAWN AND FIELD AREAS MAINTENANCE

3.5.1 Mowing

Seeded and sodded areas shall be mowed throughout the growing season to meet the requirements of paragraph GRASS PLANT QUALITY. Cutting height shall be adjusted according to type of grass. Mowing schedule shall be coordinated with the Contracting Officer. Frequency of mowing shall be adjusted so that no more than 1/4 of the leaf length is removed during a cutting.

3.5.1.1 Lawn Areas

Lawn areas shall be moved to a minimum 2-inch height when the turf is a maximum 3-inches high. Remove clippings when the amount cut prevents sunlight from reaching the ground surface.

3.6 PLANT MATERIAL QUALITY

3.6.1 General Requirements

Plant material shall be identified as native to the region of the site or as a specimen. Plant material shall be maintained as well shaped, well grown, vigorous plant material having healthy root systems. The plant material shall be maintained as free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement and abrasion. Plant material shall be free of shock or damage to branches, trunk, or root systems. Plant quality is determined by the growing conditions; climate and microclimate of the site for maintaining a healthy root system; and growth of the trunk and crown as follows.

3.6.2 Growth of Trunk and Crown

3.6.2.1 Deciduous Trees

Deciduous tree height to caliper relationship shall be maintained. Height of branching shall bear a relationship to the size and species of the tree and with the crown in good balance with the trunk. The trees shall not be "poled" or the leader removed.

- a. Single stem: The trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.
- b. Multi-stem: To be considered a stem, there shall be no division of the trunk which branches more than 6 inches from ground level.
- c. Specimen: The tree shall be well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be indicated.

3.6.2.2 Deciduous Shrubs

Deciduous shrub height to number of primary stems shall be maintained. Shrubs shall be maintained as well shaped, with sufficient well-spaced side

branches, and recognized by the trade as typical for the species grown in the region of the site.

3.6.2.3 Coniferous Evergreen Plant Material

Coniferous evergreen plant material height-to-spread ratio shall be maintained. The coniferous evergreen trees shall not be "poled" or the leader removed. The plant material shall be maintained to be well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be indicated.

3.6.2.4 Broadleaf Evergreen Plant Material

Broadleaf evergreen plant material height-to-spread ratio shall be maintained. The plant material shall be shaped to be recognized by the trade as typical for the variety grown in the region of the site.

3.6.2.5 Ground Cover and Vine Plant Material

Ground cover and vine plant material shall be maintained to have a heavy, well developed, and balanced crown with vigorous, well developed root system.

3.7 SHRUB AND HEDGE MAINTENANCE

3.7.1 Trimming and Pruning

Trimming shall be performed to ensure the following:

- a. Safety.
- b. Quality (size, height, and shape).
- c. Health (removing broken, diseased branches).
- d. Rejuvenation (removing one third to one half of the older stems or branches).
- e. Visibility (signs, building entrances, motorist line of sight).

Shrubs shall be pruned to the requirements of paragraph PLANT MATERIAL QUALITY. Pruning shall be accomplished by trained and experienced personnel in accordance with ANSI A300. The typical growth habit of individual plant material or the theme shape of the hedge shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead and broken branches shall be removed.

3.7.2 Irrigation of Shrubs and Hedges

Run-off, puddling and wilting shall be prevented.

3.7.3 Shrub Fertilization Program

A regular program of fertilization shall be established to include a fall

feeding to meet the requirements of paragraph PLANT MATERIAL QUALITY. Use industry standards for foliage and root fertilizing the plant material inventoried.

3.8 TREE MAINTENANCE

3.8.1 Trimming and Pruning of Trees

Trimming shall be performed to ensure the following:

- a. Safety.
- b. Quality (size, height).
- c. Health (removing broken, diseased wood branches).
- d. Rejuvenation (removing one third to one half of the older stems or branches).
- e. Visibility (signs, building entrances, motorist line of sight).

Trees shall be pruned to meet the requirements of paragraph PLANT MATERIAL QUALITY. Pruning shall be accomplished by trained and experienced personnel in accordance with ANSI A300. The typical growth habit of individual plant material shall be retained. Clean cuts shall be made flush with the parent trunk. Improper cuts, stubs, dead and broken branches shall be removed. "Headback" cuts at right angles to the line of growth will not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off".

3.8.2 Irrigation of Trees

Run-off, puddling and wilting shall be prevented.

3.8.3 Unhealthy Plant Material

A tree shall be considered unhealthy or dead when the main leader has died back, or up to a maximum 25 percent of the crown has died. A shrub shall be considered unhealthy or dead when up to a maximum 25 percent of the plant has died. This condition shall be determined by scraping on a branch an area 1/16 inch square, maximum, to determine if there is a green cambium layer below the bark. The Contractor shall determine the cause for unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be removed immediately.

3.9 RESTORATION AND CLEAN UP

3.9.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the maintenance operations shall be restored to original condition at Contractor's expense.

3.9.2 Clean Up

Excess and waste material shall be removed from the maintenance areas and dispose off site. Adjacent paved areas shall be cleaned as determined by the Contracting Officer.

3.10 CLEANING OF PAVED AREAS

Grass, weeds, leaves, and debris from mowing, clipping, and pruning shall be removed immediately. Excess and waste material shall be removed from paved areas and disposed off site. Debris, leaves shall be removed weekly.

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SECTION 03100

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SECTION 03100

STRUCTURAL CONCRETE FORMWORK 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 347R (1994) Guide to Formwork for Concrete

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA ANSI/AHA A135.4 (1995) Basic Hardboard

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1996) Voluntary Product Standard - Construction and Industrial Plywood

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-01 Data

Design; FIO.

Design analysis and calculations for form design and methodology used in the design.

Form Materials; FIO.

Manufacturer's data including literature describing form materials, accessories, and form releasing agents.

SD-04 Drawings

Concrete Formwork; FIO.

Drawings showing details of formwork, including dimensions of fiber voids,

joints, supports, studding and shoring, and sequence of form and shoring removal. See SECTION 03300 for additional requirements of formwork drawings.

SD-06 Instructions

Form Releasing Agents; FIO.

Manufacturer's recommendation on method and rate of application of form releasing agents.

1.3 DESIGN

Design and engineering of formwork, shoring and reshoring as well as its construction is the responsibility of the Contractor.

Formwork shall be designed by a Professional Structural Engineer currently registered in the State of Minnesota, having a minimum of 3 years experience in this type of design work and in accordance with methodology of ACI 347R for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface which meets the requirements of the class of finish specified in SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE. Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

1.3.1 Design Requirements

Design formwork for loads, lateral pressures and allowable stresses outlined in ACI 347R and for design considerations, wind loads, allowable stresses and other applicable requirements of the controlling local building code. Where conflicts occur between the above two standards, the more stringent requirements shall govern. Design formwork to limit maximum deflection of form facing materials reflected in concrete surfaces exposed to view to 1/240 of span between structural members.

1.3.2 Form Removal

Develop a procedure and schedule for removal of shores and installation of reshores and for calculating the loads transferred to the structure during this process. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon. When developing procedure, schedule and structural calculations, consider the following at each stage of construction: The structural system that exists; effects of all loads during construction; strength of concrete; the influence of deformations of the structure and shoring system on the distribution of dead loads and construction loads; the strength and spacing of shores or shoring systems used, as well as the method of shoring, bracing, shore removal, and reshoring including the minimum time intervals between the various operations; any other loading or condition that affects the safety of serviceability of the structure during construction.

PART 2 PRODUCTS

2.1 FORM MATERIALS

2.1.1 Forms For Class A and Class B Finish (Exposed to View)

Forms for Class A and Class B finished surfaces shall be plywood panels conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels. Use full 4 foot x 8 foot panels unless smaller pieces will cover entire area. Forms for round columns shall be the prefabricated seamless type.

2.1.2 Forms For Class C Finish (Not Exposed to View)

Forms for Class C finished surfaces shall be shiplap lumber; plywood conforming to DOC PS 1, Grade B-B concrete form panels, Class I or II; tempered concrete form hardboard conforming to AHA ANSI/AHA A135.4; other approved concrete form material; or steel, except that steel lining on wood sheathing shall not be used. Forms for round columns may have one vertical seam.

2.1.3 Forms For Class D Finish (Concrete to be covered with soil)

Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.

2.1.4 Form Ties

Commercially fabricated for use in form construction. Do not use wire ties. Constructed so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete. 3/4 inch minimum to 1 inch maximum diameter cones on both ends. Embedded portion of ties to be not less than 1-1/2 inch from face of concrete after ends have been removed.

2.1.5 Form Releasing Agents

Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Formwork

Install products in accordance with manufacturer's instructions. Make forms sufficiently tight to prevent loss of mortar from concrete. At construction joints, overlap contact surface of form sheathing for flush surfaces exposed to view over hardened concrete in previous placement by at

least 1 inch. Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain a true surface. Where possible, locate juncture of built-in-place wood or metal forms at architectural lines, control joints or at construction joints.

Construct wood forms for wall openings to facilitate loosening, if necessary, to counteract swelling. Anchor formwork to shores or other supporting surfaces or members so that movement of any part of formwork system is prevented during concrete placement. Provide runways for moving equipment with struts or legs, supported directly on formwork or structural member without resting on reinforcing steel. Provide positive means of adjustment (wedges or jacks) of shores and struts and take up all settlement during concrete placing operation. Securely brace forms against lateral deflection. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check.

Provide temporary openings at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed, and to limit height of free fall of concrete to prevent aggregate segregation. Temporary openings to limit height of free fall of concrete shall be spaced no more than 8 FT apart. Clean surfaces of forms, reinforcing steel and other embedded materials of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed.

3.2 CHAMFERING

Except as otherwise shown, place 3/4 inch chamfer strips in exposed to view corners of forms to produce 3/4 inch wide beveled edges.

3.3 COATING

Forms for Class A and Class B finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for Class C and D finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.4 REMOVAL OF FORMS

Forms shall be removed preventing injury to the concrete and ensuring the complete safety of the structure. Formwork for columns, walls, side of beams and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement. Supporting forms and shores shall not be removed from beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads. Supporting forms or shores shall not be removed before the concrete strength has reached 70 percent of design strength, as determined by

field-cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens, and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of forming and shoring system. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive insofar as possible, the same curing and protection as the structures they represent.

3.5 TOLERANCES FOR FORMED SURFACES

1.	Variations	from	the
	plumb:		

a.	In the lines and	In any 10 feet of
	surfaces of columns,	length 1/4 inch
	piers, walls and	Maximum for entire
	in arises	length 1/2 inch
b.	For exposed corner	In any 20 feet of
	columns,control-joint	length 1/4 inch

Maximum for entire

 Variation from the level or from the grades indicated

grades	Indicated	
on the	drawings:	
a. In	slab soffits,	

grooves, and other conspicuous lines

- a. In slab soffits, ceilings, beam soffits, and in arises, measured before removal of supporting shores
- b. In exposed lintels,
 sills, parapets,
 horizontal grooves,
 and other conspicuous
 lines
- Variation of the linear building lines from established position in plan

 Variation of distance between walls, columns, partitions

In any 10 feet of		
length	1/4	inch
In any bay or in any 20		
feet of length	3/8	inch
Maximum for entire		
length	3/4	inch

length----- 1/2 inch

In any bay or in any 20 feet of length ----- 1/4 inch Maximum for entire length----- 1/2 inch

In any 20 feet ----- 1/2 inch Maximum -----1 inch

1/4 inch per 10 feet of distance, but not more than 1/2 inch in any one bay, and not more than 1/2 inch total variation

5.	Variation in the sizes and locations of sleeves, floor openings, and wall opening	Minus 1/4 inch Plus 1/2 inch
6.	Variation in cross-sectional	Minus 1/4 inch

7.

	dim and	ess-sectional mensions of columns d beams and in the ckness of slabs and walls	Plus 1/2 inch
7.	Foo	tings:	
	a.	Variation of dimensions in plan	Minus 1/2 inch Plus 2 inches when formed or plus 3 inches when placed against unformed excavation
	b.	Misplacement of eccentricity	<pre>2 percent of the footing width in the direction of misplacement but not more than 2 inches</pre>
	C.	Reduction in thickness of specified thickness	Minus 5 percent Plus No limit except that which may interfere with other construction
8.	Var a.	riation in steps: In a flight of stairs	Riser 1/8 inch Tread 1/4 inch
	b.	In consecutive steps	Riser 1/16 inch Tread 1/8 inch

Establish and maintain in an undisturbed condition and until final completion and acceptance of Project, sufficient control points and bench marks to be used for reference purposes to check tolerances. Regardless of tolerances listed allow no portion of structure to extend beyond legal boundary of Project. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete.

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EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS $06/02 \label{eq:contraction}$

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 920	(1995) Elastomeric Joint Sealants
ASTM D 378	(1991) Rubber Belting, Flat Type
ASTM D 380	(1994) Methods of Testing Rubber Hose
ASTM D 395	(1994) Test Method for Rubber Property -Compression Set
ASTM D 412	(1992) Test Method for Rubber Properties in Tension
ASTM D 471	(1996) Rubber Property - Effect of Liquids
ASTM D 573	(1994) Test Method for Rubber - Determination in Air Oven
ASTM D 994	Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
ASTM D 1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D 1149	(1991) Test Method for Rubber Property - Young's Modulus at Normal & Abnormal Temperatures
ASTM D 1190	(1996) Concrete Joint Sealer, Hot-Applied Elastic Type Joint Sealers
ASTM D 1191	(1984) Test Methods for Concrete Joint Sealers

ASTM D 1751	(1983; R 1991) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 2240	(1991) Test Method for Rubber Property - Durometer
ASTM D 5249	(1995) Backer Material for Use With Cold and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints

CORPS OF ENGINEERS (COE)

COE CRD-C 513	(1974) Corps of Engineers Specifications for Rubber Waterstops
COE CRD-C 572	(1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Preformed Expansion Joint Filler; GA. Sealant; GA. Waterstops; GA.

Manufacturer's literature, including safety data sheets, for preformed fillers and the lubricants used in their installation; field-molded sealants and primers (when required by sealant manufacturer); and waterstops.

SD-04 Drawings

Waterstops; FIO.

Shop drawings and fabrication drawings provided by the manufacturer or prepared by the Contractor.

SD-06 Instructions

Preformed Expansion Joint Filler; FIO. Sealant; FIO. Waterstops; FIO.

Manufacturer's recommended instructions for installing preformed fillers, field-molded sealants; preformed compression seals; and waterstops; and for

splicing non-metallic waterstops.

SD-13 Certificates

Preformed Expansion Joint Filler; FIO. Sealant; FIO. Waterstops; FIO.

Certificates of compliance stating that the joint filler and sealant materials and waterstops conform to the requirements specified.

SD-14 Samples

Field-Molded Type; GA.

One gallon of field-molded sealant and one quart of primer (when primer is recommended by the sealant manufacturer) identified to indicate manufacturer, type of material, quantity, and shipment or lot represented.

Non-metallic Materials; GA.

Specimens identified to indicate manufacturer, type of material, size, quantity of material, and shipment or lot represented. Each sample shall be a piece not less than 12 inch long cut from each 200 feet of finished waterstop furnished, but not less than a total of 4 feet of each type, size, and lot furnished. One splice sample of each size and type for every 50 splices made in the factory and every 10 splices made at the job site. The splice samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each splice shall be not less than 12 inches long.

1.3 DELIVERY AND STORAGE

Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants. Sealants shall be delivered in the manufacturer's original unopened containers. Sealants whose shelf life has expired shall be removed from the site.

PART 2 PRODUCTS

2.1 PREFORMED EXPANSION JOINT FILLER

Expansion joint filler shall be preformed material. Unless otherwise indicated, filler material shall be 3/8 inch thick and of a width applicable for the joint formed. Backer material, when required, shall conform to ASTM D 5249.

2.1.1 Neoprene Expansion Joint Fillers

Materials: closed cell neoprene. ASTM D 1056, Class SC, 2 to 5 psi compression deflection, Grade SCE-41.

2.1.2 Asphalt Expansion Joint Fillers

Materials: ASTM D 994.

2.1.3 Fiber Expansion Joint Fillers

Materials: ASTM D 1751.

2.2 SEALANT

Joint sealant shall conform to the following:

2.2.1 Joint Sealant

Elastomeric (non-bituminous, gray, single-component polyurethane-type): ASTM C 920, Type S, Grade P for horizontal joints, Grade NS for vertical joints, Class 25 and use as required per paragraph 5 of ASTM C 920.

2.2.2 Hot-Poured Type (for slabs on grade)

ASTM D 1190 tested in accordance with ASTM D 1191.

2.2.3 Field-Molded Type

ASTM C 920, Type M for horizontal joints or Type NS for vertical joints, Class 25, and Use NT. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The back-up material shall be compressible, non-shrink, nonreactive with sealant, and non-absorptive material type such as extruded butyl or polychloroprene rubber.

2.3 WATERSTOPS

Intersection and change of direction waterstops shall be shop fabricated, leaving only straight butt splices for the field.

2.3.1 Rubber Belting for Type A Expansion Joint

The rubber reinforced belting incorporated in this joint shall be similar to that used for conveyor and machine belting meeting the requirements of ASTM D 380

2.3.2 Non-Metallic Materials`

2.3.2.1 PVC Waterstops

PVC waterstops shall be manufactured from virgin polyvinyl chloride compound not containing any scrap or reclaimed materials or pigment. The compound shall contain plasticizers, stabilizers, and other additives to meet specified requirements. Polyvinylchloride (PVC) waterstops shall conform to COE CRD-C 572. Rubber waterstops shall conform to COE CRD-C 513. Thermoplastic elastomeric rubber waterstops shall conform to ASTM D 471.

2.3.2.2 Expansion Joints

Materials: In expansion joints: 9 inch wide x 3/8 inch thick tear web type waterstop. 2 inch minimum horizontal movement without rupturing. Similar

to Greenstreak Plastic Products Style #700. In all other joints: 6 inch wide x 3/8 inch thick bulb type. Provide hog rings or grommets at maximum 12 inch OC along the length of the waterstop.

2.3.3 Non-Metallic Hydrophilic

Swellable strip type compound of polymer modified chloroprene rubber that swells upon contact with water shall conform to ASTM D 412 as follows: Tensile strength 420 psi minimum; ultimate elongation 600 percent minimum. Hardness shall be 50 minimum on the type A durometer and the volumetric expansion ratio in distilled water at 70 degrees F shall be 3 to 1 minimum.

PART 3 EXECUTION

3.1 JOINTS

Joints shall be installed at locations indicated and as authorized.

3.1.1 General - Construction Joints

Locate joints as indicated on Contract Drawings or as shown on approved shop drawings. Unplanned construction joints will not be allowed. If concrete cannot be completely placed between planned construction joints, then it must be removed. In general, locate joints near middle of spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case, offset joint in girder a distance equal to twice the width of the beam. Locate joints in walls and columns at underside of floors, slabs, beams, or girders, and at tops of foundations or floor slabs, unless shown otherwise. At Contractor's option, beam pockets may be formed into concrete walls. Size pockets to allow beam reinforcing to be placed as detailed on Drawings. Place beams, girders, column capitals and drop panels at same time as slabs. Make joints perpendicular to main reinforcement with all reinforcement continuous across joints. Provide roughened construction joints at all construction joints unless indicated otherwise on Drawings. Clean the previously hardened concrete interface and remove all laitance. Intentionally roughen the interface to a full amplitude of 1/4 inch. Provide recessed flat surface as required to install strip type waterstops. Allow a minimum of 48 HRS before placement of adjoining concrete construction.

3.1.2 Contraction Joints

Contraction joints may be constructed by cutting the concrete with a saw after concrete has set. Joints shall be approximately 1/8 inch wide and shall extend into the slab one-fourth the slab thickness, minimum, but not less than 1 inch.

3.1.2.1 Sawed Joints

Joint sawing shall be early enough to prevent uncontrolled cracking in the slab, but late enough that this can be accomplished without appreciable spalling. Concrete sawing machines shall be adequate in number and power, and with sufficient replacement blades to complete the sawing at the required rate. Joints shall be cut to true alignment and shall be cut in

sequence of concrete placement.

3.1.2.2 Waste Disposal

The method used in disposing of wastewater employed in cutting, washing, and rinsing of concrete surfaces shall be such that the wastewater does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area.

3.1.3 Expansion Joints

Do not permit reinforcement or other embedded metal items bonded to concrete (except smooth dowels bonded on only one side of joint) to extend continuously through an expansion joint. Use approved expansion joint fillers, unless noted otherwise on Drawings.

3.1.4 Joint Sealant

Sawed contraction joints and expansion joints in slabs shall be filled with joint sealant, unless otherwise shown. Joint surfaces shall be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Joint sealant shall be applied as recommended by the manufacturer of the sealant.

3.2 WATERSTOPS, INSTALLATION AND SPLICES

Waterstops shall be installed at the locations shown to form a continuous water-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Splices shall be made by certified trained personnel using approved equipment and procedures.

3.2.1 Non-Metallic Hydrophilic

Install on smooth surface of hardened concrete by use of nails, adhesive or other means as recommended by manufacturer to prevent movement of waterstop during placement of concrete. Waterstop to be continuous with splices in accordance with manufacturer's instructions. Use in joints against existing concrete and where indicated on Drawings.

3.2.2 PVC Bulb type

Position waterstop accurately in forms. Secure waterstops in correct position using hog rings or grommets spaced along the length of waterstop and tie wire to adjacent reinforcing. Hold horizontal waterstops in place with continuous supports. Install according to manufacturer's instructions. Do not displace reinforcement from required location. Waterstops to be continuous. Splice ends with perpendicular butt splice using electrical splicing iron in accordance with manufacturer's instructions. Unless otherwise noted, use for all construction joints in

new construction for all structures indicated on Drawings.

3.2.3 Quality Assurance

Edge welding will not be permitted. Centerbulbs shall be compressed or closed when welding to non-centerbulb type. Waterstop splicing defects which are unacceptable include, but are not limited to the following: 1) Tensile strength less than 80 percent of parent section. 2) Free lap joints. 3) Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch. 4) Misalignment which reduces waterstop cross section more than 15 percent. 5) Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness. 6) Misalignment of waterstop splice resulting in misalignment of waterstop in excess of 1/2 inch in 10 feet. 7) Visible porosity in the weld area, including pin holes. 8) Charred or burnt material. 9) Bubbles or inadequate bonding. 10) Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.

3.2.4 Non-Metallic Hydrophilic Waterstop Installation

Ends to be joined shall be miter cut with sharp knife or shears. The ends shall be adhered with cyanacryiate (super glue) adhesive. When joining hydrophilic type waterstop to PVC waterstop, the hydrophilic waterstop shall be positioned as shown on the drawings. A liberal amount of a single component hydrophilic sealant shall be applied to the junction to complete the transition.

3.3 CONSTRUCTION JOINTS

Construction joints are specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE except that construction joints coinciding with expansion and contraction joints shall be treated as expansion or contraction joints as applicable.

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06/02

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SECTION 03200

CONCRETE REINFORCEMENT 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI 318/318R	(1995) Building Code Requirements for
	Structural Concrete and Commentary

ACI SP-66 ACI Detailing Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	(1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 615	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 706	(1998) Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4 (1998) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI MSP-1 (1996) Manual of Standard Practice

1.2 QUALITY ASSURANCE

1.2.1 Quality Control

Independent Testing Agency: Contractor to employ and pay for services of a testing laboratory to: Review and approve Contractor proposed welding procedures and processes for conformance with AWS D1.4. Qualify welders in accord with AWS D1.4. Test three samples of each bar size and each type of

weld in accord with AWS D1.4. The tensile strength of each test shall be not less than 125 percent of the required yield strength of the rebar tested. Conduct nondestructive field tests (radiographic or magnetic particle) on not less than one random sample for each 10 welds. In addition if any welds are found defective, test five previous welds performed by same welder. Visually inspect each weld for presence of cracks, undercuts, inadequate size and other visible defects.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Concrete Reinforcement System; GA.

Detail drawings showing rebar number, sizes, spacing, dimensions, configurations, locations, mark numbers, lap splice lengths and locations, concrete cover and rebar supports. Sufficient rebar details to permit installation of reinforcing. Rebar details in accordance with ACI SP-66. Locations where proprietary rebar mechanical splices are required or proposed for use.

SD-06 Instructions

Adhesive Anchors; GA

Proprietary Rebar Mechanical Splices; GA

Manufacturer's installation instructions. Manufacturer and type of proprietary rebar mechanical splices. Manufacturer and type of rebar adhesive anchor including installation instructions and embedment depth required to achieve specified pull-out strength.

SD-08 Statements

Welding; FIO.

A list of qualified welders names.

SD-13 Certificates

Product Technical Data; FIO.

Acknowledgement that products submitted meet requirements of standards referenced. Mill certificates for all reinforcing attesting that the reinforcing steel furnished contains no less than 25 percent recycled scrap steel and meets the requirements specified herein, prior to the installation of reinforcing steel.

1.4 WELDING

Welders shall be qualified in accordance with AWS D1.4. Qualification test shall be performed at the worksite and the Contractor shall notify the Contracting Officer 24 hours prior to conducting tests. Special welding procedures and welders qualified by others may be accepted as permitted by AWS D1.4. Welders to have been qualified during the previous 12 months prior to commencement of welding.

1.5 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.1 DOWELS

Dowels shall conform to ASTM A 615, Grade 60, with metal end cap to allow longitudinal movement equal to joint width plus 1 inch. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2 REINFORCING STEEL

Reinforcing steel shall be deformed bars conforming to ASTM A 615 or ASTM A 706, grades and sizes as indicated. Cold drawn wire used for spiral reinforcement shall conform to ASTM A 82.

2.3 WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.4 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI MSP-1 and shall be steel or precast concrete blocks. Precast concrete blocks shall have wire ties and shall be not less than 4 inches square when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be galvanized, plastic protected or of stainless steel. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface. For slabs on grade, supports shall be precast concrete blocks or plastic coated steel fabricated with bearing plates.

2.5 PROPRIETARY REBAR MECHANICAL SPLICES

To develop in tension and compression a minimum of 125 percent of the yield strength of the rebars being spliced.

2.6 WELDING ELECTRODES

E90 meeting requirements of AWS D1.4.

2.7 REBAR ADHESIVE ANCHORS

Manufactured for the specific purpose of embedding and developing 125 percent of the yield strength of rebars in hardened concrete.

2.8 FABRICATION

2.8.1 Tolerances.

Tolerances: Sheared lengths: +/- 1 inch. Overall dimensions of stirrups, ties and spirals: +/- 1/2 inch. All other bends: +0 inch, -1/2 inch.

Minimum diameter of bends measured on the inside of the rebar to be as indicated in ACI 318/318R paragraph 7.2. Ship rebars to jobsite with attached plastic or metal tags. Place on each tag the mark number of the rebar corresponding to the mark number indicated on the shop drawing. Mark numbers on tags to be so placed that the numbers cannot be removed.

PART 3 EXECUTION

3.1 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318/318R. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Wire tie ends shall face away from the forms.

3.1.1 Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete.

Reinforcement shall be placed in accordance with ACI 318/318R at locations shown plus or minus one bar diameter (measured parallel with face of form).

Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage (measured perpendicular to face of form) shall be as indicated on drawings.

3.1.2 Splicing

Splices of reinforcement shall conform to Paragraph 12.15 of ACI 318/318R and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No. 11 unless otherwise indicated. Obtain approval by the Engineer prior to welding reinforcement. Welding shall conform to AWS D1.4. Welded butt splices shall be full penetration butt welds. Do not tack weld reinforcing. Have each welder place an

approved identifying mark near each completed weld. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6 inches. Mechanical proprietary splice connectors may only be used when approved, or indicated on the Contract Drawings. Mechanical butt splices shall be in accordance with the recommendation of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line. Where parallel horizontal reinforcement in beams is indicated to be placed in two or more layers, rebars in the upper layers shall be placed directly above rebars in the bottom layer with clear distance between layers to be 6 inches. Place spacer rebars at 3 feet maximum centers to maintain the required clear distance between layers. Extend reinforcement to within 4 inches of concrete perimeter edges unless noted otherwise on contract drawings.

3.1.3 Rebar Support

Support rebars and fasten together to prevent displacement by construction loads or placing of concrete. On ground, provide supporting concrete blocks or metal bar supports with bottom plate. Over formwork, provide chairs, runners, bolsters, spacers, hangers and other rebar support.

3.1.4 Adhesive Anchors

Embed rebars into hardened concrete utilizing adhesive anchor system specifically manufactured for such installation. Drill hole in concrete with diameter and depth as required to develop 125 percent of the yield strength of the bar according to manufacturer's requirements. Place adhesive in drilled hole. Insert rebar into hole and adhesive in accordance with manufacturer's instructions.

3.1.5 Tolerances

Rebar placement: Clear distance to formed surfaces: +1/4 inch. Minimum spacing between bars: -1/4 inch. Top bars in slabs and beams: Members 8 IN deep or less: +1/4 inch. Members between 8 inch and 2 feet deep: -1/4 inch, +1/2 inch. Members more than 2 FT deep: -1/4 inch, +1 inch. Crosswise of members: Spaced evenly within +/- 1 inch. Lengthwise of members: +/- 2 inch. Minimum clear distances between rebars: Beams, walls and slabs: Distance equal to rebar diameter or 1 inch, whichever is greater. Columns: Distance equal to 1-1/2 times the rebar diameter or 1-1/2 inch, whichever is greater. Beam and slab rebars shall be threaded through the column vertical rebars without displacing the column vertical rebars and still maintaining the clear distances required for the beam and slab rebars.

3.2 DOWEL INSTALLATION

Dowels shall be installed at locations indicated and at right angles to

joint being doweled. Dowels shall be accurately positioned and aligned parallel to the finished concrete surface before concrete placement. Dowels shall be rigidly supported during concrete placement. One end of dowels shall be coated with a bond breaker.

3.3 FIELD QUALITY CONTROL

3.3.1 Reinforcement Congestion and Interferences

Notify Engineer whenever the specified clearances between rebars cannot be met. Do not place any concrete until the Engineer submits a solution to rebar congestion problem. Rebars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If rebars are moved more than one bar diameter, obtain Engineer's approval of resulting arrangement of rebars. No cutting of rebars shall be done without written approval of Engineer.

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SECTION 03300

CAST-IN-PLACE STRUCTURAL CONCRETE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI	201.2R	(1992) Guide to Durable Concrete		
ACI	211.1	(1991)Standard Practice for Selecting Proportions for Normal, heavyweight and Mass Concrete		
ACI	212.3	(1998)Chemical Admixtures for Concrete		
ACI	301	(1996) Standard Specifications for Structural Concrete		
ACI	303	(1991) Guide to Cast-In-Place Architectural Concrete Practice		
ACI	304	(1989) Measuring, Mixing, Transporting and Placing Concrete		
ACI	304.2	(1991) Placing Concrete by Pumping Methods		
ACI	305	(1991) Hot Weather Concreting		
ACI	306	(1988) Cold Weather Concreting		
ACI	309	(1997) Guide for Consolidation of Concrete		
ACI	318/318R	(1999) Building Code Requirements for Structural Concrete and Commentary		
	AMERICANI COCCERNI SOS ES	OFFING AND MARRETTAL C. (ACRM)		

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	(1998) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1999a) Concrete Aggregates

ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 94	(1999) Ready-Mixed Concrete
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 138	(1981) Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
ASTM C 143	(1998) Slump of Hydraulic Cement Concrete
ASTM C 150	(1998a) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 173	(1994ael) Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1998) Air-Entraining Admixtures for Concrete
ASTM C 289	Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	(1999) Chemical Admixtures for Concrete
ASTM C 618	(1999) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 685	(1998a) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C 881	(1999) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C1059	(1999) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064	(1999) Temperature of Freshly Mixed Portland Cement Concrete

ASTM C 1077	(1998) Laboratories	Testing	Concrete and
	Concrete Aggregates	for Use	in

Construction and Criteria for Laboratory

Evaluation

ASTM C 1107 (1999) Packaged Dry, Hydraulic-Cement

Grout (Non shrink)

ASTM D 75 (1997) Practice for Sampling Aggregates

ASTM E 329 (1990) Standard Practice for Use in the

Evaluation of Testing and Inspection
Agencies as Used in Construction

CORPS OF ENGINEERS (COE)

COE CRD-C 621 (1989) Specification for Non-shrink Grout

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA TMMB-100 (1994) Truck Mixer Agitator and Front Discharge Concrete Carrier Standards of

the Truck Mixer Manufacturers Bureau

NRMCA QC 3 (1984) Quality Control Manual: Section 3,

Plant Certifications Checklist:

Certification of Ready Mixed Concrete

Production Facilities

1.2 QUALITY ASSURANCE

1.2.1 Quality Control.

Independent Testing Agency: Contractor to employ and pay for services of a testing laboratory to: Perform materials evaluation and inspection and to design concrete mixes. Concrete testing agency to meet requirements of ASTM E 329 and ASTM C 1077. Do not begin concrete production until proposed concrete mix design has been approved by Engineer. Approval of concrete mix design by Engineer does not relieve Contractor of his responsibility to provide concrete that meets the requirements of this Specification. Adjust concrete mix designs when material characteristics, job conditions, weather, strength test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and approved by Engineer. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon.

1.2.2 Qualifications

Ready mixed concrete batch plant certified by National Ready Mixed Concrete Association (NRMCA).

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-08 Statements

Concrete Mixture Design; GA.

The results of trial mixture design studies along with a statement giving the maximum nominal coarse aggregate size and the proportions of ingredients that will be used in the manufacture of each strength or class of concrete, at least 14 days prior to commencing concrete placing operations. Aggregate weights shall be based on the saturated surface dry condition. The statement shall be accompanied by test results from an approved independent commercial testing laboratory, showing that mixture design studies have been made with materials proposed for the project and that the proportions selected will produce concrete of the qualities indicated. No substitutions shall be made in the materials used in the mixture design studies without additional tests to show that the quality of the concrete is satisfactory.

A mix design shall be submitted for each concrete mix to be used on the project. Concrete mix design submittal is to include the following information:

- a. Sieve analysis and source of fine and coarse aggregates.
- b. Test for aggregate organic impurities.
- c. Test for deleterious aggregate per ASTM C 289.
- d. Proportioning of all materials.
- e. Type of cement with mill certificate for cement.
- f. Type of fly ash with certificate of conformance to specification requirements.
- g. Slump.
- h. Air content.
- i. Brand, type, ASTM designation, and quantity of each admixture proposed for use.
- j. 28-day cylinder compressive test results of trial mixes per ACI 318/318R and as indicated herein.
- k. Shrinkage test results.
- 1. Standard deviation value for concrete production facility. Project Data. Submit evidence obtained within the last 5 years from previous quality control testing on the concrete mix.
- m. Results of fine aggregate tests for gradation and durability.
- n. Results of coarse aggregate tests for gradation and durability.

All materials included in the mixture shall be of the same type and from the same source as will be used on the project. Each mix shall be accompanied by evidence by one of the following methods that demonstrates the mix will produce concrete having the characteristics and quality as specified:

a. Project Data. Submit evidence obtained within the last 5 years

from previous quality control testing on the concrete mix.

b. Mix Design Study. Submit a mix design study complying with ACI 211.1 conducted in the past 12 months. The mix design shall be completed by a testing laboratory complying with ASTM C 1077.

Project data or mix design studies shall be obtained for the exact mix as submitted. Minor mix alterations or substitutions may be accepted if approved by the Contracting Officer. Any alternations or substitutions shall be clearly identified, and shall be accompanied by recommendations from the admixture supplier or a registered professional engineer indicating the expected effects on the concrete.

Concrete Operation Plan; GA.

The plan shall demonstrate a thorough understanding of all involved technical and logistical conditions necessary for the production of concrete that meets all requirements of these specifications. The plan shall provide as a minimum the following:

- a. Sources of cement, pozzolan, and aggregates.
- b. Location of aggregate stockpiles, batching plant, and mixing plant.
- c. Method and route for conveying batched concrete under all expected weather conditions.
- d. Method of conveying concrete within the project.
- e. Sources of electrical power and water.
- f. Provisions for replacement of required equipment in the event of breakdown.
- g. Methods for preventing aggregate stockpiles from freezing, moisture variation, or contamination.
- h. Methods of consolidation and curing. Include manufacturer's literature.
- i. Contractor quality control.

Cold Weather Plan; GA.

If concrete is to be placed under cold weather conditions, the procedures, materials, methods, and protection proposed to accomplish it shall be submitted for review.

Hot Weather Plan; GA.

If concrete is to be placed under hot weather conditions, the procedures, materials, methods, and protection proposed to accomplish it shall be submitted for review.

Joint Treatment Plan; GA..

The methods and equipment proposed for joint cleanup and waste disposal shall be submitted for review.

SD-09 Reports

Concrete Testing Reports; FIO.

Per Article 3.13.

SD-13 Certificates

Manufacturer's Certificates; GA.

The following materials shall be certified for compliance with all specification requirements. Submit manufacturer, type and product literature:

- a. Cement and pozzolan
- b. Impervious sheet curing materials
- c. Admixtures
- d. Curing compound
- e. Bonding and patching mortar
- f. Bonding agent and epoxy adhesive
- g. Non-shrink grout and cure/seal compound
- f. Special surface finish materials

Batch Tickets; FIO

Batch tickets shall be collected and furnished to the Contracting Officer for each load of ready-mixed concrete. The batch tickets do not need to be transmitted through the submittal process. Ticket to show:

- 1) Mix identification mark.
- 2) General name of structure to which concrete is to be placed.
- 3) Quantity delivered.
- 4) Amount of each material in batch.
- 5) Outdoor temperature in the shade.
- 6) Time at which cement was added.
- 7) Time of delivery.
- 8) Time of discharge.
- 9) Numerical sequence of the delivery.
- 10) Amount of water added.

1.4 CONSTRUCTION TOLERANCES

Variation in alignment, grade, and dimensions of the structures from the established alignment, grade, and dimensions shown shall be within the tolerances specified in SECTION 03100 - CONCRETE FORMWORK.

1.4.1 Appearance

Finished surfaces shall be protected from stains or abrasions. Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by an approved method that does not harm the concrete. Abrupt variations in color, shade, or tint will not be permitted on these surfaces.

1.5 STORAGE OF MATERIALS

Cement and other cementitious materials shall be stored in weathertight buildings, bins, or silos which will exclude moisture and contaminants and

keep each material completely separated. Do not use cementitious materials if caked or lumpy. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Aggregate shall not be stored directly on ground unless a sacrificial layer is left undisturbed. Do not use frozen or partially frozen aggregates. Allow sand to drain until moisture content is uniform prior to use. Reinforcing bars and accessories shall not be stored on cohesive soils or areas that may puddle water. Other materials shall be stored in such a manner as to avoid contamination and deterioration. Admixtures which have been in storage at the project site for longer than 6 months or which have been subjected to freezing shall not be used unless retested and proven to meet the specified requirements. Materials shall be capable of being accurately identified after bundles or containers are opened.

1.6 GOVERNMENT ASSURANCE INSPECTION AND TESTING

The Contracting Officer may appoint a Government representative or an independent testing laboratory to inspect construction and monitor operations of the Contractor's CQC staff as considered appropriate for quality assurance. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Government inspection or testing will not relieve the Contractor of any of it's CQC responsibilities. Failure to detect defective work or material will not prevent rejection later when a defect is discovered nor will it obligate the Government for final acceptance.

PART 2 PRODUCTS

2.1 GENERAL CONCRETE REQUIREMENTS

Concrete shall be ready mixed concrete conforming to ASTM C 94. All concrete to be normal weight concrete. Water-cement ratio shall not exceed 0.44. Materials shall meet the requirements of the respective publications and other data specified below.

2.1.1 Strength Requirements

The design compressive strength (f'c) shall not be less than 4,000 pounds per square inch. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Design compressive strength (f'c) shall be evaluated for acceptance at 28 days unless pozzolan is used, in which case the design strength shall be met in 90 calendar days, provided the 90-day period does not extend past the contract expiration date. Members identified with concrete not meeting the criteria shall be replaced. The Contractor may conduct additional testing to verify strength or further define the limits of inferior concrete if approved by the Contracting Officer.

2.1.2 Slump

Slump of the concrete, as delivered to the point of placement into the forms, shall not exceed 3 inches and, shall not be less than 1 inch. Slump is measured at point of discharge of the concrete into the concrete construction member. If a superplastizer is used, the slump shall not exceed 3 inches before the admixture is added and shall not exceed 8 inches at the point of delivery after the admixture is added. Concrete of lower than minimum slump may be used provided it can be properly placed and consolidated. Pumped concrete: Provide additional water at batch plant to allow for slump loss due to pumping. Provide only enough additional water so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified above. Determine slump per ASTM C 143.

2.1.3 Admixtures

Concrete shall not contain admixtures that provide special properties to the concrete unless specified or approved. Admixtures to be used on the project shall be included in the mix design submittals. Accelerating admixtures shall be used only during cold weather and when approved in writing.

2.1.3.1 Air Entrainment

Air entrained concrete will be required in all structures except for the footings of the closure structures.

Reference ACI 201.2R, Table 1.4.3, recommended air content for severe exposure:

Nominal max. aggregate 3/4" 1" 1.5" 3"

Ave. air content 6% 6% 5.5% 4.5%

A reasonable tolerance is + or - 1.5% subject to the limits in the following paragraph:

All concrete shall be air entrained to contain between 5 and 7 percent total air. Air content to be measured in accordance with ASTM C 231, ASTM C 173, or ASTM C 138.

2.1.4 Gradation of Aggregates

Nominal maximum size coarse aggregate shall be 1-1/2 inches, except 3/4 inch nominal maximum size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 7-1/2 inches, the depth of the slab is less than 4-1/2 inches, or the minimum cover or clear spacing between reinforcing is less than 2 inches.

2.2 CEMENTITIOUS MATERIALS

Cementitious materials shall be portland cement, or portland cement in combination with pozzolan. If pozzolan is used, it shall not be less than 15% nor more than 25% by weight of the total cementitious material.

Cementitious materials shall conform to appropriate specifications listed below. Use of cementitious materials in concrete which will have surfaces exposed in the completed structure shall be restricted so there is no change in color, source, or type of cementitious material.

2.2.1 Portland Cement

ASTM C 150, Type I with a maximum 15 percent amount of tricalcium aluminate, or Type II.

2.2.2 Pozzolan (Fly Ash)

ASTM C 618, Class C or F with the optional requirements for multiple factor, drying shrinkage, and uniformity from Table 2A of ASTM C 618. Requirement for maximum alkalies from Table 1A of ASTM C 618 shall apply. Nonstaining. Hardened concrete containing fly ash to be uniform light gray color. Maximum loss on ignition: 4 percent. Compatible with other concrete ingredients.

2.3 AGGREGATES

2.3.1 Composition

Fine aggregate shall consist of clean natural sand. Coarse aggregate shall consist of natural gravel, crushed rock, or other inert granular material. Maximum amount of clay or shale particles: 1 percent.

2.3.2 Quality

The aggregate particles shall be clean, hard, unweathered, and uncoated. The shape of the particles shall be generally cubical or spherical. Where required, fines shall be removed from the aggregates by adequate washing. The aggregates as delivered to the mixer shall meet the quality requirements of ASTM C 33, Table 3 for the appropriate type or location of concrete construction for use in a severe climate.

2.3.3 Sources

Unless approved otherwise, aggregates shall be produced from the sources listed in SECTION 00830 - ATTACHMENTS. If the Contractor proposes to furnish aggregates from a source not listed, the Government will make such tests and other investigations as necessary to determine whether or not aggregates meeting the requirements of this project can be produced from the proposed source. The tests to which the aggregate will be subjected may include specific gravity, absorption, Los Angeles abrasion, soundness in magnesium sulfate, petrographic analysis, freezing and thawing in concrete, alkali-aggregate reaction, organic impurities, deleterious materials, and other tests necessary to determine that concrete of acceptable quality and cost can be produced from the materials proposed. These tests will be conducted in accordance with the applicable Corps of Engineers methods of testing given in the Handbook for Concrete and Cement. When the Contractor desires to use aggregates from a source not listed, suitable samples for quality evaluation consisting of not less than 700 pounds of each size of coarse aggregate and 300 pounds of fine aggregates

shall be taken in accordance with ASTM D 75 and delivered to the Contracting Officer or to a laboratory as directed. Sampling and shipping of samples shall be at the Contractor's expense. A maximum of 120 calendar days will be required to complete evaluation of the aggregate.

2.4 CHEMICAL ADMIXTURES

Chemical admixtures, when required or permitted, shall conform to the appropriate specification listed.

- a. Air-Entraining Admixture. ASTM C 260 and shall consistently entrain the air content in the specified ranges under field conditions.
- b. Accelerating Admixture. ASTM C 494, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.
- c. Water-Reducing or Retarding Admixture. ASTM C 494, Type A and B.
- d. High-Range Water Reducer. ASTM C 494, Type F or G.
- e. Do not use retarding or accelerating admixtures unless specifically approved in writing by Engineer and at no cost to Owner.

2.5 CURING MATERIALS

2.5.1 Impervious-Sheet

Impervious-sheet materials shall conform to ASTM C 171, type optional, except that polyethylene sheet shall be white opaque.

2.5.2 Membrane-Forming Compound

Membrane-Forming curing compound shall conform to ASTM C 309, Type 1-D or 2, except that only a styrene acrylate or chlorinated rubber compound meeting Class B requirements shall be used for surfaces that are to be painted or are to receive bituminous roofing, or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing, or flooring specified. Nonpigmented compound shall contain a fugitive dye, and shall have the reflective requirements in ASTM C 309 waived. Membrane-forming curing compound shall not be used on surfaces that are to be treated with floor hardener.

2.6 WATER

Water for mixing and curing shall be fresh, clean, potable, and free of oil, acid, salt, or alkali. Water for curing shall not contain any substance that stains the concrete. River water shall not be used.

2.7 GROUT

2.7.1 Nonshrink Grout:

Nonmetallic, noncorrosive, nonstaining, premixed with only water to be added. Grout to produce a positive but controlled expansion. Mass expansion not to be created by gas liberation. Minimum compressive strength of nonshrink grout at 28 days: 6500 psi.

2.7.2 Epoxy Grout:

3-component epoxy resin system: Two liquid epoxy components and one inert aggregate filler component. Each component packaged separately for mixing at jobsite.

2.8 BONDING AGENT

ASTM C1059, Type II.

2.9 BONDING GROUT

One part cement to one part aggregate. Mix cement and aggregate. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions. Add bonding agent/water mixture to cement/aggregate mixture. Mix to consistency of thick cream. Bonding agent itself may be used as bonding grout if approved by manufacturer and Engineer.

2.10 PATCHING MORTAR

One part cement to two and one-half parts aggregate by damp loose volume. Substitute white Portland cement for a part of gray Portland cement to produce color matching surrounding concrete. Mix cement and aggregate. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions. Add only enough bonding agent/water mixture to cement/aggregate mixture to allow handling and placing. Let stand with frequent manipulation with a trowel, until mix has reached stiffest consistency to allow placement.

2.11 EPOXY ADHESIVE

ASTM C 881, Type V.

2.12 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated or as needed for the application. Dovetail slots shall be galvanized steel. Inserts for shelf angles and bolt hangers shall be of malleable iron or cast or wrought steel.

PART 3 EXECUTION

3.1 CONCRETE FINISH SCHEDULE

a. Broomed Finish. A broomed finish shall be applied to the following surfaces: walks, exterior stairs, surfaces to receive terrazzo, treads of concrete pan stairs, and exterior slab closure. Exterior surfaces shall be sloped for drainage, unless otherwise shown.

- b. Float Finish. Surfaces to be float-finished shall include the top of the structural slab where insulation is to be applied and all remaining surfaces not specified elsewhere. The finished surface shall be a true plane within 5/16 inch in 10 feet.
- c. Trowel Finish. A steel trowel finish shall be applied to all floor surfaces, unless otherwise specified or indicated.
- d. Forms. Surfaces, unless another type of finish is specified, shall be left with the texture imparted by the forms, except defective surfaces shall be repaired as described below. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.
- e. Horizontal Concrete Repairs. Concrete shall be screeded, floated, and lightly troweled to a finish approved by the Contracting Officer. The finished surface shall be a true plane within 5/16 inch in 10 feet.

3.2 PREPARATION FOR PLACING

Surfaces to receive concrete shall be clean, damp and free from frost, ice, mud, loose particles, foreign matter, and water. Forms shall be in place, cleaned, coated, and adequately supported. Reinforcing steel shall be in place, cleaned, tied, and adequately supported. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition and in sufficient amount for the entire placement. Concrete shall not be placed before the completion of all adjacent pile driving or other operations that might prove detrimental to freshly placed concrete.

3.2.1 Soil Subgrades

Immediately prior to setting forms and reinforcement, the foundation shall be compacted with a manual tamper.

3.2.2 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Conduit and other embedded items shall be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids.

3.3 CONCRETE PRODUCTION

Concrete shall be furnished from a ready-mixed concrete plant, except that small batches for pours less than 2 cubic yards may be batched on-site.

Ready-mixed concrete shall be batched, mixed, and transported in accordance with ASTM C 94. Truck mixers, agitators, and nonagitating transporting units shall comply with NRMCA TMMB-100. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA QC 3. Aluminum pipes, chutes, troughs, spouts, or tremies shall not be used for pumping, conveying, or placing concrete.

3.3.1 Concrete Mixers

The mixers shall not be charged in excess of the capacity recommended by the manufacturer. Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94. Each truck shall be equipped with two counters from which it is possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

3.3.2 Site Mixed Concrete

If the Contractor elects to provide an on site batching and mixing plant, a batch type plant shall be provided of sufficient capacity to prevent cold joints. Site-mixed concrete shall be produced in conformance with ACI 301, or by volumetric batching and continuous mixing in conformance with ASTM C 685.

3.4 TRANSPORTING CONCRETE TO PROJECT SITE

Concrete shall be transported to the placing site in truck mixers.

3.5 CONVEYING CONCRETE ON SITE

Concrete shall be conveyed from mixer to forms by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper, which is conical in shape, and shall not be dropped vertically more than 5 feet, except where suitable equipment is provided to prevent segregation and where specifically authorized. Trucks shall be equipped with radios or phones to permit communication between the mixing plant and the concrete placement site.

3.5.1 Concrete Pumps

The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three times the nominal maximum size coarse aggregate in the concrete mixture to be pumped, but not less than 5 inches. The maximum size coarse aggregate will not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms and in compliance with the approved environment protection plan.

3.6 PLACING CONCRETE

Place concrete in compliance with ACI 304 and ACI 304.2. Mixed concrete shall be discharged within 1-1/2 hour or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the length of haul makes it impossible to deliver truck- mixed concrete within this time limit, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site. Concrete shall be placed within 15 minutes after it has been discharged from the transporting unit. Sufficient placing capacity shall be provided so that concrete can be kept free of cold joints. Do not allow concrete to freefall more than 4 feet.

3.6.1 Depositing Concrete

Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 18 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screeded to the proper level. Concrete shall be deposited continuously so that fresh concrete is deposited on in-place concrete that is still plastic.

3.6.2 Consolidation

Consolidation of concrete shall conform to ACI 309, except as otherwise specified. Immediately after placing, each layer of concrete shall be consolidated by internal vibrators. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete. A spare vibrator shall be kept at the jobsite during all concrete placing operations. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a reasonable amount. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then vertically withdrawn slowly while operating. Form vibrators shall not be used unless specifically approved and unless forms are constructed to withstand their use. Vibrators shall not be used to move concrete within the forms. Excessive vibration of concrete resulting in segregation shall be prevented.

3.6.3 Cold Weather Requirements

Concrete shall not be placed without a procedure approved in accordance with paragraph: SUBMITTALS when the concrete is likely to be subjected to freezing temperatures before the expiration of the curing period. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. The placing temperature of the concrete shall be as recommended in ACI 306, Table 3.1, with the temperature of the concrete measured in accordance with ASTM C 1064. Do not place heated

concrete that is warmer than 80 degrees F. Air and form temperature in contact with concrete shall be above 50 degrees F prior to placing concrete and maintained for the first 3 days, and at a temperature above 32 degrees F for the remainder of the specified curing period. Do not place concrete on frozen ground. Thermometers shall be installed at such locations as may be directed. Suitable thermometers shall be furnished by the Contractor and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. During the period of protection removal, heat shall be shut down and insulation or tents shall removed in a systematic schedule such that the temperature differential between the air and concrete surface does not exceed 25 degrees F. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure, and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. Materials entering the mixer shall be free from ice, snow, or frozen lumps.

3.6.4 Hot Weather Requirements

Concrete shall be properly placed and finished with approved procedures in accordance with paragraph: SUBMITTALS. When hot, windy conditions during concreting appear probable, equipment and material shall be at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete. The concrete-placing temperature shall not exceed 85 degrees F (60 degrees F for concrete for horizontal repairs). Cooling of the mixing water or aggregates or placing concrete in the cooler part of the day may be required to obtain an adequate placing temperature. Steel forms and reinforcements shall be cooled prior to concrete placement when steel temperatures are greater than 120 degrees F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature. When the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305, may reasonably be expected to exceed 0.2 pounds per square feet per hour, provision for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

3.7 JOINTS

All joints not shown on the drawings are subject to approval by the Contracting Officer. Joints shall be perpendicular to the main reinforcement. Place waterstops per SECTION 03150: EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS.

3.7.1 Construction Joints

Concrete shall be placed continuously so that structural members are monolithic in construction. Construction joints shall be located and constructed as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type of construction joint shall be subject to approval of the Contracting Officer. Fresh concrete shall not be placed against adjacent hardened concrete until it is at least 48 hours old.

3.7.1.1 Preparation for Construction Joints

Concrete surfaces to which other concrete is to be bonded shall be abraded in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Surfaces shall be thoroughly washed and shall be damp but without free water when concrete is placed or joint shall be coated with epoxy adhesive or cement grout. The concrete surface shall be free of all accumulated laitance, coatings, stains, debris, loose material, and other foreign matter. Laitance shall be removed when the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse aggregate particles. The surface shall be cleaned as the last operation prior to closing forms and obstructing the area with reinforcement.

3.7.2 Expansion and Contraction (Control) Joints

See SECTION 03150: EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

3.8 REPAIR OF SURFACE DEFECTS

3.8.1 Preparation for Surface Repairs

Preparation for surface repairs shall follow the requirements for preparation for construction joints, with the following additional criteria: The surface preparation shall include air-water cutting, sandblasting, high-pressure water jet, or other approved method. The surface shall be cleaned as the last operation prior to placing concrete or obstructing the area with reinforcement. The surface shall be watered for 12 hours prior to placing concrete. Horizontal surfaces shall be air blasted to remove puddled water.

3.8.2 Repairing Surface Defects

Repair shall follow procedure of "Finishing Formed Surfaces" below.

3.9 FINISHING FORMED SURFACES

Beginning no more than 24 hours after form removal,, all fins and loose materials shall be removed. All voids and honeycombs exceeding 1/2 inch in diameter and all tie rod holes shall be reamed or chipped and filled with patching mortar. Voids and honeycomb shall be dampened, brush-coated with a neat cement grout or with an approved bonding agent, and filled with patching mortar. Allow bonding grout to set for period of time required by bonding agent manufacturer before applying premixed patching mortar.

Mortar shall be thoroughly compacted inplace and struck off to adjacent concrete, or mortar during remedial work, including curing, shall be above 50 F. The patched areas shall be cured for seven days. Defective areas larger than 36 square inches in any surface shall be replaced or corrected as directed by the Contracting Officer.

3.9.1 Ordinary and Sack Rubbed Surface Finishes

An Ordinary Surface Finish or Sack Rubbed Surface Finish shall be applied to new exposed concrete surfaces of the Pump Station K-12 tie-in walls and

discharge levee chamber/gate well and the closure structure surfaces not covered with brick or shale veneer. It shall also include the existing concrete surface of the flood wall adjacent to K-12 that is exposed due to re-grading or damaged by construction. The term "exposed surfaces", as used hereinafter, shall mean exposed to public view in the completed structure above a point 6 inches below the final groundline. The Contractor, at the Contractor's option, may use the Sack Rubbed Method to fill smaller voids in lieu of the Ordinary Method. In addition to the Ordinary or Sack Rubbed Surface Finish, a Special Surface Finish will be applied to the new concrete and also a Special Surface Finish will be applied to existing concrete. All exposed new concrete surfaces shall receive an ordinary or sack rubbed surface finish.

3.9.1.1 Ordinary Surface Finish

As soon as possible after removal of the forms, the concrete surfaces shall be examined for areas of unsound concrete and defective surfaces due to improper concrete placement, faulty form work, faulty form removal, and other causes. Concrete with porosity, honey comb, or segregated materials shall be removed and replaced, but the ordinary surface finish shall not be started until the Engineer has viewed the extent of the defective concrete and has approved the time and method of repair and the materials to be used. In general, small areas may be repaired with mortar as specified for surface cavities; large areas may require concrete with formed surfaces.

A bonding agent, mechanical bonds, or both may be required, and all repair work shall be cured in an approved manner. When defects in a concrete section are so extensive that satisfactory repairs cannot be made, that section will be considered unacceptable work. All fins and irregular projections shall be removed from exposed surfaces and form surfaces that will be waterproofed. All surface cavities produced by form ties, and on exposed surfaces, any surface cavities (bug holes) with a diameter of approximately 3/8 inch and larger, and smaller surface cavities so closely spaced as to be conspicuous shall be thoroughly cleaned, saturated with water, and filled with mortar. The mortar shall consist of 1 part white cement, 2 parts standard Portland cement, 6 parts mortar sand, and water. For surfaces which will not be exposed to view, standard Portland cement may be substituted for the white cement. The amount of water used shall produce a mortar consistency as dry as possible to use effectively, and to further reduce plastic shrinkage, the mortar shall be mixed about one hour in advance of use. An approved latex or acrylic-based bonding agent shall be incorporated into the mortar used for performing the ordinary surface finish. with mortar, thoroughly compacted into place, pointed, and trimmed flush with the concrete surface.

On exposed surfaces, mortar stains or streaks outside the area of the filled cavity shall be avoided and, if they should occur, they shall be removed. When the specifications or drawings do not specify additional surface finishing on an exposed surface, at the time of completion of all concrete work on the structure, all conspicuous streaks, stains, and blemishes shall be removed from the surface. Additional surface finishing shall also be done on an exposed surface that requires only ordinary surface finish, when the ordinary surface finish is performed before the completion of the curing period for the concrete being finished, the

finishing shall be done with a minimum of interruption to the curing.

3.9.1.2 Sack Rubbed Surface Finish

Where numerous surface voids are present on an exposed surface, the Sack Rubbed Finish may be used to fill the smaller voids in lieu of the method described under Ordinary Surface Finish. However, the filling of form tie holes and other large cavities shall be done as specified under Ordinary Surface Finish. As a preparatory operation, the entire surface shall be ground with a high-speed, electric, disk-type grinder or sandblasted until blemishes, discoloration, and thin mortar films covering surface voids have been removed. When the structure has been completed to the extent that further blemishes and discolorations on the surface will not result from any remaining construction, the final operations shall be performed as follows:

1) Initial Operation

The surface shall be thoroughly saturated with water and while the surface is still moist, a mortar mixture (consisting of 1 part white cement, 1 part standard Portland cement, and 2 parts mortar sand, with sufficient water added to produce a moderately thick paste) shall be applied to the wetted area with a rubber float, starting at the top. All voids shall be completely filled during this operation. If any portion of the surface shows evidence of becoming dry before the mortar is applied, it shall be rewetted.

2) Operations During Mortar Cure

After the mortar has set sufficiently to be retained within the voids, and before it has become completely dry, the entire surface which has been floated with mortar shall be rubbed with a small burlap sack filled with a dry mix (sand and cement only) of the mortar described above. All mortar in excess of that required to fill the voids shall be removed during the dry mortar sack rubbing operations. In lieu of the dry mix filled burlap sack, any equally effective means of removing the excess mortar will be approved.

3) Final Operation

The completed surface shall be free of blemishes, discolorations, surface voids, and conspicuous form marks. The surface shall be uniform in texture and appearance except for the difference in texture between filled voids and the remainder of the surface. Surfaces that do not meet these requirements shall be corrected to the satisfaction of the Engineer.

3.9.2 Special Surface Finish

A special surface finish will be required on all new exposed surfaces of the Pump Station K-12 tie-in walls and discharge levee chamber/gate well and the closure structure surfaces not covered with brick or shale veneer. It shall also include the existing concrete surface of the flood wall adjacent to K-12 that is exposed due to re-grading or damaged by construction. The term "exposed surfaces", as used hereinafter, shall mean exposed to public view in the completed structure above a point 6 inches

below the final groundline.

The objective of this operation is to obtain a surface that is reasonably smooth and uniform in texture and appearance. The Special Surface Finish requirements shall not relieve the Contractor of full responsibility for performing the Ordinary Surface Finish as specified. The Special Surface Finishing shall be performed using an approved mixture of commercial packaged mortar acrylic-based bonding agent, with acrylic-based paint in a gray color, similar to that of the floodwall adjacent to Pump Station K-12, as approved by the Government. The materials used for the mixture shall be compatible with each other.

Manufactures' data sheets showing applicability to the project use and with storage, mixing, and application instructions shall be submitted for approval. The same material and methods shall be used for all surfaces specified to be given a Special Surface Finish. Formed surfaces and existing surfaces shall receive a sweep sandblast to break the surface film and to remove all laitance, form release agent, and other foreign matter that may impede adhesion of the Special Surface Finish. All surfaces that are to receive a Special Surface Finish shall be thoroughly flushed down with clean water not more than 24 hours before commencing the Special Surface Finish. The approved materials shall be thoroughly mixed with water in accordance with an approved formulation and to the degree necessary for application in accordance with the manufacturer's instructions. The mixture shall be applied by brushing or spraying in sufficient thickness to completely cover the original surface with a one-coat application, but shall not be so that as to cause runs, sags, or a "plastered" effect.

The final surface after drying shall be uniform in color and texture, with no evidence of laps or breaks in continuity, and shall generally be lighter in color than the original concrete, but not white. Application of the Special Finish shall not be started until all work which might mar the surface finish has been completed, nor until the finish operations can be carried on continuously from beginning to completion on any one flat surface. Corrective work, as directed, will be required over any areas which have not been satisfactorily finished, including as much adjacent area as may be necessary to achieve uniform appearance, all at the Contractor's expense.

3.10 FINISHING UNFORMED SURFACES

The finish of all unformed surfaces shall meet the requirements of paragraph Tolerances in PART 1, when tested as specified herein.

3.10.1 General

Unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish, with additional finishing as specified below, and shall be true to the elevation shown on the drawings. Unless otherwise shown on the drawings, exterior surfaces shall be sloped for drainage, as directed. Joints shall be carefully made with a jointing or edging tool. The dusting of surfaces with dry cement or other materials or the addition of any water during finishing shall not be permitted. If bleedwater is present prior to finishing, the excess water shall be

carefully dragged off or removed by absorption with porous materials such as burlap. Slabs with surfaces which exhibit significant crazing shall be removed and replaced.

3.10.2 Rough Slab Finish

As a first finishing operation for unformed surfaces and as final finish for slabs to receive mortar setting beds, the surface shall receive a rough slab finish. The concrete shall be screeded with straightedge strikeoffs immediately after consolidation to bring the surface to the required finish level with no coarse aggregate visible. Side forms and screed rails shall be provided, rigidly supported, and set to exact line and grade.

3.10.3 Floated Finish

Screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. After the concrete has stiffened it shall be floated to a true and even plane free of ridges. Floating shall be performed by use of suitable hand floats or power driven equipment.

3.10.4 Troweled Finish

The finished surface shall be thoroughly consolidated and shall be steel-troweled to a smooth, even, dense finish, free from blemishes including trowel marks and be uniform in texture and appearance. A final hard steel troweling shall be done by hand, with the trowel tipped, and using hard pressure, when the surface is at a point that the trowel will produce a ringing sound. Tolerance shall be true planes within 5/16 inch in 10 feet as determined by a 10 foot straightedge placed anywhere on the slab in any direction.

3.10.5 Broomed Finish

After floating, the surface shall be lightly steel troweled, and then carefully scored by pulling a coarse fiber push-type broom across the surface. Brooming shall be transverse to traffic or at right angles to the slope of the slab. After the end of the curing period, the surface shall be vigorously broomed with a coarse fiber broom to remove all loose or semi-detached particles.

3.11 CURING AND PROTECTION

Concrete shall be cured by an approved method for a period of 7 days, except that cement blended with pozzolan shall be cured for 14 days.

3.11.1 General

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and damage from rain and flowing water. Materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat, including

welding, shall be permitted near or in direct contact with the concrete at any time. In cold weather, follow curing procedures in Cold Weather Plan. In hot weather, follow curing in Hot Weather Plan

3.11.2 Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period, commencing immediately after finishing. When wooden forms are left in place during curing, they shall be kept wet at all times. Surfaces shall be cured by ponding, by continuous sprinkling, by continuously saturated burlap or cotton mats, or by continuously saturated plastic coated burlap. Burlap and mats shall be clean and free from any contamination and shall be completely saturated before being placed on the concrete. The Contractor shall have an approved work system to ensure that moist curing is continuous 24 hours per day. If inspection identifies an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for those areas shall be extended by 1 day.

3.11.3 Membrane forming Curing Compounds

Membrane curing will not be permitted on any surface to which sack-rubbed finish or smooth finish is to be applied. Membrane curing shall not be used on surfaces containing protruding steel reinforcement, or surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete, such as additional concrete, hardeners, sealers, terrazzo, or abrasive aggregate finish. Clear or translucent membrane-forming compound with fugitive dye shall be used on all surfaces permanently exposed to view, and white pigmented compound may be used on all other surfaces. A styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B requirements, may be used for surfaces which are to be painted or are to receive bituminous roofing or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing or flooring. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam.

Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. All surfaces shall be thoroughly moistened with water. Curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 75 psi, at a uniform coverage of not more than 400 square feet per gallon for each coat, and the second coat shall be applied perpendicular to the first coat. Allow preceding coat to completely dry prior to applying the next coat. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. Surfaces on which clear compound is used shall be shaded from direct rays of the sun for the first 3 days. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and

contamination during the curing period.

Appearance is a primary consideration for exterior concrete surfaces exposed to view. The Contractor shall exercise extreme care to apply curing compound evenly on these surfaces. Variations in shade, color, or tint, resulting from uneven application of curing compound, shall be repaired by and at the expense of the Contractor as directed.

3.11.4 Impervious Sheeting

Surfaces shall be thoroughly wetted and be completely covered with sheeting. Sheeting shall be at least 18 inches wider than the concrete surface to be covered. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 12 inches and securely weighted down or shall be lapped not less than 4 inches and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. If inspection identifies tears, holes, laps or joints that are not completely closed, the tears and holes shall immediately be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by 1 day.

3.11.5 Ponding or Immersion

Water shall not be more than $\ 20$ degrees F less than the temperature of the concrete.

3.12 GROUT

3.12.1 Grout Schedule of Use

- a. Nonshrink grout: Filling form tie holes, under column and beam base plates, other uses indicated on the Drawings.
- b. Epoxy grout: Patching cavities in concrete, grouting of dowels and anchor bolts into existing concrete, other uses indicated on the Drawings.

3.12.2 Grout Installation

a. Nonshrink grout: Clean concrete surface to receive grout. Saturate concrete with water for 24 HRS prior to grouting. Mix in a mechanical mixer. Use no more water than necessary to produce flowable grout. Place in accordance with manufacturer's instructions. Provide under beam, column, and equipment base plates, and in other locations indicated on the Drawings. Completely fill all spaces and cavities below the top of base plates. Provide forms where base plates and bed plates do not confine grout. Where exposed to view, finish grout edges smooth. Except where a slope is indicated on the Drawings, finish edges flush at the base plate, bed plate, member or piece of equipment. Coat exposed edges of grout with cure or seal compound recommended by the grout manufacturer.

b. Epoxy grout: Mix and place in accordance with manufacturer's instructions. Apply only to clean, dry, sound surface. Completely fill all cavities and spaces around dowels and anchors without voids. Grout base and bed plates as specified for nonshrink grout. Obtain manufacturer's field technical assistance as required to assure proper placement.

3.13 TESTING AND INSPECTION FOR CONTRACTOR QUALITY CONTROL

The Contractor's Independent Testing Agency shall perform the inspection and tests described below and, based upon the results of these inspections and tests, shall take the action required and shall submit specified reports. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease and the operation shall be corrected. If the Government conducts quality assurance testing, the Contractor shall assist in collection of samples as directed. All necessary platforms, tools, and equipment for obtaining samples shall be furnished by the Contractor.

3.13.1 Gradation

3.13.1.1 Fine Aggregate

At least once during each shift when the concrete plant is operating, there shall be one sieve analysis in accordance with ASTM C 136.

3.13.1.2 Coarse Aggregate

At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate.

3.13.2 Concrete Mixture

- a. Air Content Testing. Air content tests shall be measured when compressive strength specimens are fabricated. Specified air content shall be attained at point of placement into the forms. Measurement shall be in accordance with ASTM C 231.
- c. Slump Testing. The concrete slump shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 143. The slump shall be reported along with the compressive strength data.
- e. Temperature. The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064. The temperature shall be reported along with the compressive strength data.
- f. Strength Specimens. Test cylinders shall be cast for compressive strength tests for each mix design at the following rates:
 - a. not less than once each day when pour exceeds 8 cubic yards.

- b. not less than once for each 125 cubic yards of concrete.
- c. the number of test cylinders need not exceed 3 sets per day for each \min .

A set of test specimens shall consist of four cylinders, one to be tested at 7 days and two at 28 days. If either of the 28 day breaks does not meet the specified strength, the fourth cylinder shall be tested at 90 days, otherwise it shall be discarded. Test specimens shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Results of all strength tests shall be reported immediately to the Contracting Officer.

3.13.3 Inspection Before Placing

Foundations, construction joints, forms, and embedded items shall be inspected by the Contractor in sufficient time prior to each concrete placement in order to certify to the Contracting Officer that they are ready to receive concrete. Full cooperation shall be given other trades to install embedded items. Suitable templates or instructions shall be used for setting items not placed in the forms.

3.13.4 Cold-Weather Protection

At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. Any deficiencies shall be noted, corrected, and reported.

3.13.5 Reports

The results of all tests and inspections conducted at the project site, as well as corrective actions taken, shall be reported in writing weekly and shall be delivered to the quality assurance representative within three days after the end of each weekly reporting period. The Contracting Officer has the right to examine all Contractor quality control records.

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06/02

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SECTION 03360

SIMULATED STONE MASONRY 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1308	(1987; R 1998) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D 3359	(1997) Measuring Adhesion by Tape Test
ASTM G 23	(1996) Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Simulated Stone Masonry; GA

Plan, elevation and details to show overall pattern, joint locations, form tie locations, and end, edge and other special conditions.

SD-14 Samples

Panel; FIO

The Contractor shall submit a 24 inch \times 24 inch sample of each the simulated stone masonry finishes for approval. Sample is to demonstrate the finish described in paragraph DESIGN REQUIREMENTS.

Form Ties; FIO

Form ties, sample and description, showing method of separation when forms are removed.

1.3 DESIGN REQUIREMENTS

Design and pattern of the concrete surface shall follow the manufacturer's standard drawing. If an actual stone surface or stone wall to be matched is available, the completed colored and formed concrete surface shall match the natural material as closely as possible. See Section 04200 MASONRY for stone type. Patterning of simulated stone masonry shall appear natural and non-repeating. Seam lines or match lines caused from two of more molds coming together will not be apparent when viewing final wall. Final coloration of cast stone concrete surface shall accurately simulate the appearance of real stone including the multiple colors, shades, flecking, and veining that is apparent in real stone. It shall also demonstrate the colors that may be apparent from aging, such as staining from oxidation, rusting and/or organic staining from soil and/or vegetation. The colors used for the railroad closure in Reach 3 in Grand Forks, North Dakota shall match those used in the previous Grand Forks, Phase 1 Levee project as close as practicable. Note that in paragraph SUBMITTAL and Part 3, EXECUTION, a sample and mockup are required. Upon approval by the Contracting Officer's Representative, mockup shall serve as quality standard for the project.

1.4 QUALITY ASSURANCE

Manufacturer of simulated stone masonry molds and custom coloring system shall have 5 years experience making stone masonry molds and color stains to create formed concrete surfaces to match natural stone shapes, surface textures and colors.

Pre-installation meeting: Schedule conference with manufacturer representative to ensure understanding of simulated stone masonry molds use, color application, requirements for construction of mockup, and to coordinate the work.

1.5 PROJECT CONDITIONS

Environmental requirements: Apply color stain when ambient temperatures are between 50 and 100 degrees F. Consult manufacturer if conditions differ from this requirement.

1.6 SEQUENCING

Schedule color stain application with earthwork and backfilling of any wall areas making sure that all simulated stone texture is colored to the minimum distance below grade. Delay adjacent plantings until color application is completed. Coordinate work to permit coloring applications without interference from other trades.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Simulated Stone Masonry Molds

Reusable, made of high-strength urethane, easily attachable to forms. Molds shall not compress more than 1/4 inch when concrete is poured at rate of 10 vertical feet per hour. Molds shall be removable without causing deterioration of surface or underlying concrete.

2.1.1.1 Floodwall Simulated Stone Form Liner Patterns

Type A: #12008, Mankato Cut Stone as manufactured by Custom Rock International, Scott System, Inc. or approved equal.

Type B: #12005, Bear Path Coursed Stone as manufactured by Custom Rock International, Scott System, Inc. or approved equal.

Type C: #11016, Random Cut Stone, as manufactured by Custom Rock International, Scott System, Inc. or approved equal.

2.1.2 Release Agent

Compatible with simulated stone masonry molds and with color stain system to be applied to surface. Consult manufacturer.

2.1.3 Form Ties

Form ties shall be made of either metal or fiberglass. Using metal ties which result in a portion of the tie permanently embedded in the concrete shall be designed to separate at least 1 inch back from finished surface, leaving only a neat hole that can be plugged with patching material. Contractor shall submit the type of form ties to the Engineer, project designer or Owner for approval prior to use in this work.

2.1.4 Mortar Joints

Joints shall be colored to simulate real mortar.

2.1.5 Color Stain

CRI pigmented stain is a special penetrating stain mix, as provided by manufacturer, and shall achieve color variations present in the natural stone being simulated for this project, as required by Architect/Engineer and Owner as referenced in paragraph DESIGN REQUIREMENTS. Stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight or weathering. Stain mix shall be a water borne, low V.O.C. material, less than 289 grams/liter, and shall meet requirements for weathering resistance of 2000 hours accelerated exposure measured by weather-o-meter in accordance with ASTM G 23. Scrub test 1000 revolutions. Abrasive resistance (Tabor-CF-10) 500 cycles. Adhesion ASTM D 3359 1.00MM cross cuts on glass pass 3 or higher on a scale of 1 to 5. Supply information pertaining to chemical resistance ASTM D 1308 to 87.

PART 3 EXECUTION

3.1 ACCEPTABLE INSTALLERS

3.1.1 Formed Concrete Construction

Five years experience pouring vertically formed architectural concrete. Installer shall be trained in manufacturer's special techniques in order to achieve realistic surfaces.

3.1.2 Color Stain System Application

Manufacturer or manufacturer's authorized representative.

3.2 CONSTRUCTION

Mockup: Build on site sixty days before work starts, using same materials, methods and work force that will be used for the project.

Architect/Engineer and Owner will determine specific requirements and location, and whether mockup shall be incorporated into the project.

- 1. Size: 50 square feet, or larger if needed to adequately illustrate the pattern and texture selected.
- 2. Include an area to demonstrate wall mold butt joint and if appropriate, continuation of pattern through expansion joint.
- 3. If design includes stone texture across top of wall, include in mockup.
- 4. After concrete work on mockup is completed and cured for a minimum of 28 days, and after surface is determined to be acceptable for coloring, apply color stain system.
- 5. After coloring is determined to be acceptable by the Architect/Engineer and Owner, construction of project may proceed, using mockup as quality standard.

3.3 SPECIAL TECHNIQUES

3.3.1 Forming Textured Concrete

For preparation, clean simulated stone masonry molds and make free of buildup prior to each pour. Inspect for blemishes or tears. Repair if needed following manufacturer's recommendations. Place stone molds with less than 1/4 inch separation between them. Attach molds to form securely following manufacturer's recommendations. Apply form release agent following manufacturers' recommendations. Form stripping and related construction shall avoid creating defects in finished surface. If the pattern selected has molds connecting through the middle of the stones, carefully remove the seam line created by abutting molds. Match the texture and shape of the surrounding stone, avoiding visible seams or mold marks. Place form ties at thinnest points of molds (high points of finished wall). Neatly patch the hole remaining after disengaging the protruding portion of the tie so that it will not be visible after coloring the concrete surface. Where an expansion joint must occur at a point other than at mortar or

rustication joints, such as at the face of concrete texture which is to have the appearance of stone, consult manufacturer for proper treatment of expansion material.

3.3.2 Applying Color Stain System

All simulated stone surfaces that are to be stained and any patching that has been done in these areas shall be at least 30 days old. Clean surface prior to application of stain materials to assure that surface is free of latency, dirt, dust, grease, efflorescence, paint, or other foreign material, following manufacturer's instructions for surface preparation. Do not sandblast. Preferred method to remove latency is pressure washing with water, minimum 3000 psi (a rate of 3 to 4 gallons per minute), using fan nozzle perpendicular to and at a distance of 1 or 2 feet from surface. Completed surface shall be free of blemishes, discoloration, surface voids and unnatural form marks.

3.4 PROTECTION

Where exposed soil or pavement is adjacent which may spatter dirt or soil from rainfall, or where surface my be subject to over spray from other processes, provide temporary cover of completed work.

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SECTION 04200

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SECTION 04200

MASONRY 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

ACI SP-66 (1994) ACI Detailing Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 153/A 153M	(1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 615/A 615M	(1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 55	(1997a) Concrete Brick
ASTM C 62	(1997a) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 67	(1998a) Sampling and Testing Brick and Structural Clay Tile
ASTM C 90	(1998) Loadbearing Concrete Masonry Units
ASTM C 91	(1998) Masonry Cement
ASTM C 126	(1996) Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
ASTM C 129	(1997) Nonloadbearing Concrete Masonry Units
ASTM C 140	(1998b) Sampling and Testing Concrete Masonry Units

ASTM C 216	(1998) Facing Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 270	(1997ael) Mortar for Unit Masonry
ASTM C 476	(1998) Grout for Masonry
ASTM C 494	(1998) Chemical Admixtures for Concrete
ASTM C 578	(1995) Rigid, Cellular Polystyrene Thermal Insulation
ASTM C 641	(1982; R 1991) Staining Materials in Lightweight Concrete Aggregates
ASTM C 652	(1997) Hollow Brick (Hollow Masonry Units Made From Clay or Shale)
ASTM C 744	(1998) Prefaced Concrete and Calcium Silicate Masonry Units
ASTM C 780	(1996) Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM C 1019	(1989a; R 1998) Sampling and Testing Grout
ASTM C 1072	(1998) Measurement of Masonry Flexural Bond Strength
ASTM C 1289	(1998) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D 2000	(1998c) Rubber Products in Automotive Applications
ASTM D 2240	(1997el) Rubber Property - Durometer Hardness
ASTM D 2287	(1996) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
ASTM E 119	(1998) Fire Tests of Building Construction and Materials
ASTM E 447	(1992b) Compressive Strength of Masonry Prisms

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals with an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Concrete Masonry Units (CMU); GA. Burnished Concrete Masonry Units; GA Insulation; GA.

Manufacturer's descriptive data.

SD-08 Statements

Cold Weather Installation; GA.

Cold weather construction procedures.

SD-09 Reports

Field Testing of Mortar; GA. Field Testing of Grout; GA. Masonry Cement; GA.

Test reports from an approved independent laboratory. Test reports on a previously tested material shall be certified as the same as that proposed for use in this project.

Special Inspection; GA.

Copies of masonry inspector reports.

SD-13 Certificates

Insulation, Cavity Wall, 2-inch Thickness; FIO.

Certificate attesting that the polyurethane or polyisocyanurate insulation furnished for the project contains recovered material, and showing an estimated percent of such recovered material.

SD-14 Samples

Concrete Masonry Units (CMU); GA. Burnished Concrete Masonry Units; GA. Stone Items; GA

Color samples of three stretcher units and one unit for each type of special shape. Units shall show the full range of color and texture.

Insulation; GA.

One piece of board type insulation, not less than 16 inchesby 24 inches in size, containing the label indicating the rated permeance and R-values.

Portable Panel; GA.

One panel of burnished concrete masonry units (BCMU), 2 feet by 2 feet, containing approximately 12 BCMU facings to establish range of color and texture.

1.3 SAMPLE MASONRY PANELS

After material samples are approved and prior to starting masonry work, sample masonry panels shall be constructed for each type and color of masonry required. At least 48 hours prior to constructing the sample panel or panels, the Contractor shall submit written notification to the Contracting Officer's Representative. Sample panels shall not be built in, or as part of the structure, but shall be located where directed.

1.3.1 Configuration

Panels shall be L-shaped or otherwise configured to represent all of the wall elements. Panels shall be of the size necessary to demonstrate the acceptable level of workmanship for each type of masonry represented on the project. The minimum size of a straight panel or a leg of an L-shaped panel shall be 4 feet long by 6 feet high.

1.3.2 Composition

Panels shall show full color range, texture, and bond pattern of the masonry work. The Contractor's method for mortar joint tooling; grouting of reinforced vertical cores; positioning and lapping of joint reinforcement (including prefabricated corners); and cleaning of masonry work shall be demonstrated during the construction of the panels. Installation or application procedures for anchors, wall ties, CMU control joints, insulation, flashing, and weep holes shall be shown in the sample panels. The panels shall contain a masonry bonded corner that includes a bond beam corner.

1.3.3 Construction Method

Where anchored veneer walls are required, the Contractor shall demonstrate and receive approval for the method of construction; i.e., either bring up the two wythes together or separately, with the insulation and appropriate ties placed within the specified tolerances across the cavity. Temporary provisions shall be demonstrated to preclude mortar or grout droppings in the cavity and to provide a clear open air space of the dimensions shown on the drawings. Where masonry is to be grouted, the Contractor shall demonstrate and receive approval on the method that will be used to bring up the masonry wythes; support the reinforcing bars; and grout cells, bond beams, lintels, and collar joints using the requirements specified herein. If sealer is specified to be applied to the masonry units, sealer shall be applied to the sample panels. Panels shall be built on a properly designed concrete foundation.

1.3.4 Usage

The completed panels shall be used as the standard of workmanship for the type of masonry represented. Masonry work shall not commence until the sample panel for that type of masonry construction has been completed and approved. Panels shall be protected from the weather and construction operations until the masonry work has been completed and approved. After completion of the work, the sample panels, including all foundation concrete, shall become the property of the Contractor and shall be removed

from the construction site.

1.4 DELIVERY, HANDLING, AND STORAGE

Materials shall be delivered, handled, stored, and protected to avoid chipping, breakage, and contact with soil or contaminating material.

1.4.1 Masonry Units

Concrete masonry units shall be covered or protected from inclement weather and shall conform to the moisture content as specified in ASTM C 90when delivered to the jobsite. In addition, glass block units and prefaced concrete units shall be stored with their finish surfaces covered. Prefabricated lintels shall be marked on top sides to show either the lintel schedule number or the number and size of top and bottom bars.

1.4.2 Reinforcement, Anchors, and Ties

Steel reinforcing bars, coated anchors, ties, and joint reinforcement shall be stored above the ground. Steel reinforcing bars and uncoated ties shall be free of loose mill scale and rust.

1.4.3 Cementitious Materials, Sand and Aggregates

Cementitious and other packaged materials shall be delivered in unopened containers, plainly marked and labeled with manufacturers' names and brands. Cementitious material shall be stored in dry, weathertight enclosures or be completely covered. Cement shall be handled in a manner that will prevent the inclusion of foreign materials and damage by water or dampness. Sand and aggregates shall be stored in a manner to prevent contamination or segregation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

The source of materials which will affect the appearance of the finished work shall not be changed after the work has started except with Contracting Officer's approval.

2.2 CONCRETE BRICK

Concrete brick shall conform to ASTM C 55, Type I, Grade N-I. Concrete brick may be used where necessary for filling out in concrete masonry unit construction.

2.3 CONCRETE MASONRY UNITS (CMU)

Hollow and solid concrete masonry units shall conform to ASTM C 90, Type I. Cement shall have a low alkali content and be of one brand.

2.3.1 Aggregates

Lightweight aggregates and blends of lightweight and heavier aggregates in

proportions used in producing the units, shall comply with the following requirements when tested for stain-producing iron compounds in accordance with ASTM C 641: by visual classification method, the iron stain deposited on the filter paper shall not exceed the "light stain" classification.

2.3.2 Kinds and Shapes

Units shall be modular in size and shall include closer, jamb, header, lintel, and bond beam units and special shapes and sizes to complete the work as indicated. In exposed interior masonry surfaces, units having a bullnose shall be used for vertical external corners at doors, windows, and louver jambs. Radius of the bullnose shall be 1 inch. Units used in exposed masonry surfaces in any one building shall have a uniform fine to medium texture and a uniform color.

2.3.2.1 CMU-1

Standard concrete masonry unit, natural gray color (Anchor Block 1200)

2.3.2.2 CMU-2

4" veneer rock face (Amcon Block). Integral color shall be selected for Pump Station K 14. CMU-2 rock face shall be #357 Hershey, as produced by Amcon Block, Inc. or approved equal. Size: 8" x 16" x 4". Amcon Block, Inc., 2211 Highway 10 SE, St. Cloud, MN 56302. Phone number: 1-888-251-6030.

2.3.2.3 BCMU-3

4" veneer burnished block units, with integral color. BCMU-3 shall be as produced by Amcon Block, Inc.; color #256 River Rock; size 8" x 16" x 4", scored as 8" x 8", or approved equal. Quantity shall be 1/3 of overall burnished block area, to be integrated into field with BCMU-4.

2.3.2.4 BCMU-4

4" veneer burnished block units, with integral color. BCMU-4 shall be as produced by Amcon Block, Inc.; color #586 Dark Malt; size 8" x 16" x 4", scored as 8" x 8", or approved equal. Quantity shall be 2/3 of overall burnished block area, to be integrated into field with BCMU-3.

2.4 STONE ITEMS

Stone for veneer facing and wall coping shall be limestone and shall be cut to the design shown. Limestone shall be natural, deep ledge quarried limestone. Stone shall have beds and joints at right angles to the face, with sharp, true arises. Copings and sills shall be provided with washes, and where overhangs the walls, shall have drips cut on the underside.

2.4.1 Ashlar Stone (STN-1)

Provide random ashlar split stone comprised of course heights of approximately 15% 2-1/8", 40% 4-7/8", 35% 7-1/2", 10% 10-1/8", with color mix of 34% golden buff, 34% grey, and 32% cream; Mankato-Kasota Stone

"Church Mix" pattern, split face.

2.5 MORTAR

Mortar shall be Type S in accordance with the proportion specification of ASTM C 270 except Type S cement-lime mortar proportions shall be 1 part cement, 1/2 part lime and 4-1/2 parts aggregate; Type N cement-lime mortar proportions shall be 1 part cement, 1 part lime and 6 parts aggregate; when masonry cement ASTM C 91 is used the maximum air content shall be limited to 12 percent and performance equal to cement-lime mortar shall be verified. Verification of masonry cement performance shall be based on ASTM C 780 and ASTM C 1072. Mortar for burnished concrete masonry units shall contain aggregates with 100 percent passing the No. 8 sieve and 95 percent passing the No. 16 sieve. Cement shall have a low alkali content and be of one brand. Aggregates shall be from one source.

2.5.1 Admixtures

In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to ASTM C 494, Type C.

2.5.2 Coloring

Mortar coloring shall not be added to the mortar. Standard grey mortar shall be used for all CMU and BCMU installations.

2.6 GROUT

Grout shall conform to ASTM C 476. Cement used in grout shall have a low alkali content. Grout slump shall be between 8 and 10 inches. Grout shall be used subject to the limitations of Table III. Proportions shall not be changed and materials with different physical or chemical characteristics shall not be used in grout for the work unless additional evidence is furnished that the grout meets the specified requirements.

2.6.1 Admixtures

In cold weather, a non-chloride based accelerating admixture may be used subject to approval. Accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to ASTM C 494, Type C.

2.6.2 Grout Barriers

Grout barriers for vertical cores shall consist of fine mesh wire, fiberglass, or expanded metal.

2.7 ANCHORS, TIES, AND BAR POSITIONERS

Anchors and ties shall be fabricated without drips or crimps and shall be zinc-coated in accordance with ASTM A 153/A 153M, Class B-2. Steel wire used for anchors and ties shall be fabricated from steel wire conforming to

ASTM A 82. Anchors and ties shall be sized to provide a minimum of 5/8 inch mortar cover from either face.

2.7.1 Wall Ties

Wall ties shall be rectangular-shaped or Z-shaped fabricated of 3/16 inch diameter zinc-coated steel wire. Rectangular wall ties shall be no less than 4 inches wide. Wall ties may also be of a continuous type conforming to paragraph JOINT REINFORCEMENT. Adjustable type wall ties, if approved for use, shall consist of two essentially U-shaped elements fabricated of 3/16 inch diameter zinc-coated steel wire. Adjustable ties shall be of the double pintle to eye type and shall allow a maximum of 1/2 inch eccentricity between each element of the tie. Play between pintle and eye opening shall be not more than 1/16 inch. The pintle and eye elements shall be formed so that both can be in the same plane.

2.7.2 Dovetail Anchors

Dovetail anchors shall be of the flexible wire type, 3/16 inch diameter zinc-coated steel wire, triangular shaped, and attached to a 12 gauge or heavier steel dovetail section. These anchors shall be used for anchorage of veneer wythes or composite-wall facings extending over the face of concrete columns, beams, or walls. Cells within vertical planes of these anchors shall be filled solid with grout for full height of walls or partitions, or solid units may be used. Dovetail slots are specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.8 JOINT REINFORCEMENT

Joint reinforcement shall be factory fabricated from steel wire conforming to ASTM A 82, welded construction. Tack welding will not be acceptable in reinforcement used for wall ties. Wire shall have zinc coating conforming to ASTM A 153/A 153M, Class B-2. All wires shall be a minimum of 9 gauge. Reinforcement shall be ladder type design, having one longitudinal wire in the mortar bed of each face shell for hollow units and one wire for solid units. Joint reinforcement shall be placed a minimum of 5/8 inch cover from either face. The distance between crosswires shall not exceed 16 inches. Joint reinforcement for straight runs shall be furnished in flat sections not less than 10 feet long. Joint reinforcement shall be provided with factory formed corners and intersections. If approved for use, joint reinforcement may be furnished with adjustable wall tie features.

2.9 REINFORCING STEEL BARS AND RODS

Reinforcing steel bars and rods shall conform to ASTM A 615/A 615M, Grade 60.

2.10 EXPANSION-JOINT MATERIALS

Backer rod and sealant shall be adequate to accommodate joint compression equal to 50 percent of the width of the joint. The backer rod shall be compressible rod stock of polyethylene foam, polyurethane foam, butyl rubber foam, or other flexible, nonabsorptive material as recommended by the sealant manufacturer. Sealant shall conform to Section 07900JOINT

SEALING.

2.11 INSULATION

2.11.1 Rigid Board-Type Insulation

Rigid board-type insulation shall be extruded polystyrene, polyurethane, or polyisocyanurate. Polystyrene shall conform to ASTM C 578. Polyurethane or polyisocyanurate shall conform to ASTM C 1289, Type I, Class 2, faced with aluminum foil on both sides of the foam. The insulation shall be a standard product and shall be marked with not less than the manufacturer's trademark or name, the specification number, the permeance and R-values.

2.11.1.1 Insulation Thickness and Air Space

The cavity space shall allow for a maximum insulation thickness of 2 inches, and a minimum air space of 2 inches.

2.11.1.2 Aged R-Value

The insulation shall provide a minimum aged R-value of 11 for the overall thickness. The aged R-value shall be determined at 75 degrees F in accordance with the appropriate referenced specification. The stated R-value of the insulation shall be certified by an independent testing laboratory or certified by an independent Registered Professional Engineer if tests are conducted in the manufacturer's laboratory.

2.11.1.3 Recovered Material

Insulation shall contain the highest practicable percentage of recovered material derived from solid waste (but material reused in the manufacturing process cannot be counted toward the percentage of recovered material). Where two materials have the same price and performance, the one containing the higher recovered material content shall be provided. The polyurethane or polyisocyanurate foam shall have a minimum recovered material content of 9 percent by weight of the core material.

2.11.2 Insulation Adhesive

Insulation adhesive shall be specifically prepared to adhere the insulation to the masonry and, where applicable, to the thru-wall flashing. The adhesive shall not deleteriously affect the insulation, and shall have a record of satisfactory and proven performance for the conditions under which to be used.

2.12 FLASHING

2.12.1 Rubberized Asphalt Sheet Flashing

Self-sealing, self-healing, fully adhering composite flexible flashing, consisting of pliable, highly adhesive, rubberized asphalt, bonded completed, and integrally to multiple plies of 8 mil minimum, high density cross laminated, polyethylene film, 40 mil thick total, minimum, protected by release sheet. Include primer, surface conditioner, mastic, and other

accessories as recommended by the manufacturer.

2.13 WEEP HOLES

Provide weep holes of 1/4-inch cotton sash cord rope wicks spaced at 24-inches on center.

2.14 SURFACE TREATMENTS

2.14.1 Water Repellant for Exterior Concrete Masonry

Clear, penetrating, breathable water repellant that bonds with silica with the following characteristics:

- (1) Active substance: alkyltrialkoxy silanes.
- (2) Denatured ethanol alcohol.
- (3) Active content: 20 percent.
- (4) Density: 6.7 pounds per gallon.

2.14.2 Burnished Block Sealer

Block manufacturer's standard sealer.

PART 3 EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

3.1.1 Hot Weather Installation

The following precautions shall be taken if masonry is erected when the ambient air temperature is more than 99 degrees F in the shade and the relative humidity is less than 50 percent. All masonry materials shall be shaded from direct sunlight; mortar beds shall be spread no more than 4 feet ahead of masonry; masonry units shall be set within one minute of spreading mortar; and after erection, masonry shall be protected from direct exposure to wind and sun for 48 hours.

3.1.2 Cold Weather Installation

Before erecting masonry when ambient temperature or mean daily air temperature falls below 40 degrees F, a written statement of proposed cold weather construction procedures shall be submitted for approval. The following precautions shall be taken during all cold weather erection.

3.1.2.1 Preparation

Ice or snow formed on the masonry bed shall be thawed by the application of heat. Heat shall be applied carefully until the top surface of the masonry is dry to the touch. Sections of masonry deemed frozen and damaged shall be removed before continuing construction of those sections.

- a. Air Temperature 40 to 32 Degrees F. Sand or mixing water shall be heated to produce mortar temperatures between 40 degrees F and 120 degrees F.
- b. Air Temperature 32 to 25 Degrees F.Sand and mixing water shall be heated to produce mortar temperatures between 40 degrees F and 120 degrees F. Temperature of mortar on boards shall be maintained above freezing.
- c. Air Temperature 25 to 20 Degrees F. Sand and mixing water shall be heated to provide mortar temperatures between 40 degrees F and 120 degrees F. Temperature of mortar on boards shall be maintained above freezing. Sources of heat shall be used on both sides of walls under construction. Windbreaks shall be employed when wind is in excess of 15 mph.
- d. Air Temperature 20 Degrees F and below. Sand and mixing water shall be heated to provide mortar temperatures between 40 degrees F and 120 degrees F. Enclosure and auxiliary heat shall be provided to maintain air temperature above 32 degrees F. Temperature of units when laid shall not be less than 20 degrees F.

3.1.2.2 Completed Masonry and Masonry Not Being Worked On

- a. Mean daily air temperature 40 degrees F to 32 degrees F. Masonry shall be protected from rain or snow for 24 hours by covering with weather-resistive membrane.
- b. Mean daily air temperature 32 degrees F to 25 degrees F. Masonry shall be completely covered with weather-resistant membrane for 24 hours.
- c. Mean Daily Air Temperature 25 Degrees F to 20 Degrees F. Masonry shall be completely covered with insulating blankets or equally protected for 24 hours.
- d. Mean Daily Temperature 20 Degrees F and Below. Masonry temperature shall be maintained above 32 degrees F for 24 hours by enclosure and supplementary heat, by electric heating blankets, infrared heat lamps, or other approved methods.

3.2 LAYING MASONRY UNITS

Masonry units shall be laid in running bond pattern. Facing courses shall be level with back-up courses, unless the use of adjustable ties has been approved in which case the tolerances shall be plus or minus 1/2 inch. Each unit shall be adjusted to its final position while mortar is still soft and plastic. Units that have been disturbed after the mortar has stiffened shall be removed, cleaned, and relaid with fresh mortar. Air spaces, cavities, chases, expansion joints, and spaces to be grouted shall be kept free from mortar and other debris. Units used in exposed masonry surfaces shall be selected from those having the least amount of chipped edges or other imperfections detracting from the appearance of the finished

work. Vertical joints shall be kept plumb. Units being laid and surfaces to receive units shall be free of water film and frost. Solid units shall be laid in a nonfurrowed full bed of mortar. Mortar for veneer wythes shall be beveled and sloped toward the center of the wythe from the cavity side. Units shall be shoved into place so that the vertical joints are tight. Vertical joints of brick and the vertical face shells of concrete masonry units, except where indicated at control, expansion, and isolation joints, shall be completely filled with mortar. Mortar will be permitted to protrude up to 1/2 inch into the space or cells to be grouted. Means shall be provided to prevent mortar from dropping into the space below. In double wythe construction, the inner wythe may be brought up not more than 16 inches ahead of the outer wythe. Collar joints shall be filled with mortar or grout during the laying of the facing wythe, and filling shall not lag the laying of the facing wythe by more than 8 inches.

3.2.1 Surface Preparation

Surfaces upon which masonry is placed shall be cleaned of laitance, dust, dirt, oil, organic matter, or other foreign materials and shall be slightly roughened to provide a surface texture with a depth of at least 1/8 inch. Sandblasting shall be used, if necessary, to remove laitance from pores and to expose the aggregate.

3.2.2 Forms and Shores

Forms and shores shall be sufficiently rigid to prevent deflections which may result in cracking or other damage to supported masonry and sufficiently tight to prevent leakage of mortar and grout. Supporting forms and shores shall not be removed in less than 10 days.

3.2.3 Concrete Masonry Units

Units in piers, pilasters, columns, starting courses on footings, solid foundation walls, lintels, and beams, and where cells are to be filled with grout shall be full bedded in mortar under both face shells and webs. Other units shall be full bedded under both face shells. Head joints shall be filled solidly with mortar for a distance in from the face of the unit not less than the thickness of the face shell. Foundation walls below grade shall be grouted solid. Jamb units shall be of the shapes and sizes to conform with wall units. Solid units may be incorporated in the masonry work where necessary to fill out at corners, gable slopes, and elsewhere as approved. Double walls shall be stiffened at wall-mounted plumbing fixtures by use of strap anchors, two above each fixture and two below each fixture, located to avoid pipe runs, and extending from center to center of the double wall. Walls and partitions shall be adequately reinforced for support of wall-hung plumbing fixtures when chair carriers are not specified.

3.2.4 Tolerances

Masonry shall be laid plumb, true to line, with courses level. Bond pattern shall be kept plumb throughout. Corners shall be square unless noted otherwise. Except for walls constructed of prefaced concrete masonry units, masonry shall be laid within the following tolerances (plus or minus

unless otherwise noted):

TABLE II

TOLERANCES

Variation from the plumb in the lines and surfaces of columns, walls and arises

In adjacent masonry units	1 / 8	inch
In 10 feet	•	inch
In 20 feet	· ·	inch
In 40 feet or more	1/2	inch
Variations from the plumb for external corners, expansion joints, and other conspicuous lines		
In 20 feet	1/4	inch
In 40 feet or more	1/2	inch
Variations from the level for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines		
In 20 feet	1/4	inch
In 40 feet or more	1/2	inch
Variation from level for bed joints and top surfaces of bearing walls		
In 10 feet	1/4	inch
In 40 feet or more	· ·	inch
Variations from horizontal lines		
In 10 feet	1 / Δ	inch
In 20 feet	-, -	inch
In 40 feet or more	•	inch
Variations in cross sectional dimensions of columns and in thickness of walls		
Minus		inch inch
Plus	1/2	TUCI

3.2.5 Cutting and Fitting

Full units of the proper size shall be used wherever possible, in lieu of

cut units. Cutting and fitting, including that required to accommodate the work of others, shall be done by masonry mechanics using power masonry saws. Concrete masonry units may be wet or dry cut. Wet cut units, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp. Openings in the masonry shall be made carefully so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry bed joints. Reinforced masonry lintels shall be provided above openings over 12 inches wide for pipes, ducts, cable trays, and other wall penetrations, unless steel sleeves are used.

3.2.6 Jointing

Joints shall be tooled when the mortar is thumbprint hard. Horizontal joints shall be tooled last. Joints shall be brushed to remove all loose and excess mortar. Mortar joints shall be finished as follows:

3.2.6.1 Flush Joints

Joints in concealed masonry surfaces and joints at electrical outlet boxes in wet areas shall be flush cut. Flush cut joints shall be made by cutting off the mortar flush with the face of the wall. Joints in unparged masonry walls below grade shall be pointed tight. Flush joints for architectural units, such as fluted units, shall completely fill both the head and bed joints.

3.2.6.2 Tooled Joints

Joints in exposed exterior and interior masonry surfaces shall be tooled slightly concave. Joints shall be tooled with a jointer slightly larger than the joint width so that complete contact is made along the edges of the unit. Tooling shall be performed so that the mortar is compressed and the joint surface is sealed. Jointer of sufficient length shall be used to obtain a straight and true mortar joint.

3.2.6.3 Door and Window Frame Joints

On the exposed interior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch. On the exterior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch.

3.2.7 Joint Widths

Joint widths shall be as follows:

3.2.7.1 Concrete Masonry Units

Concrete masonry units shall have 3/8 inch joints, except for prefaced concrete masonry units.

3.2.8 Embedded Items

Spaces around built-in items shall be filled with mortar. Openings around flush-mount electrical outlet boxes in wet locations shall be pointed with mortar. Anchors, ties, wall plugs, accessories, flashing, pipe sleeves and other items required to be built-in shall be embedded as the masonry work progresses. Anchors, ties and joint reinforcement shall be fully embedded in the mortar. Cells receiving anchor bolts and cells of the first course below bearing plates shall be filled with grout.

3.2.9 Unfinished Work

Unfinished work shall be stepped back for joining with new work. Toothing may be resorted to only when specifically approved. Loose mortar shall be removed and the exposed joints shall be thoroughly cleaned before laying new work.

3.2.10 Masonry Wall Intersections

Each course shall be masonry bonded at corners and elsewhere as shown. Masonry walls shall be anchored or tied together at corners and intersections with bond beam reinforcement and prefabricated corner or tee pieces of joint reinforcement as shown.

3.3 ANCHORED VENEER CONSTRUCTION

The inner and outer wythes shall be completely separated by a continuous airspace as shown on the drawings. Both the inner and the outer wythes shall be laid up together except when adjustable joint reinforcement assemblies are approved for use. When both wythes are not brought up together, through-wall flashings shall be protected from damage until they are fully enclosed in the wall. The airspace between the wythes shall be kept clear and free of mortar droppings by temporary wood strips laid on the wall ties and carefully lifted out before placing the next row of ties.

3.4 WEEP HOLES

Weep holes shall be provided not more than 24 inches on centers in mortar joints of the exterior wythe above wall flashing, over foundations, bond beams, and any other horizontal interruptions of the cavity. [Weep holes shall be formed by placing lengths of No. 10, 5/16 inch nominal diameter, braided cotton sash cord in the mortar. Other approved methods may be used for providing weep holes. Weep holes shall be kept free of mortar and other obstructions.

3.5 COMPOSITE WALLS

Masonry wythes shall be tied together with joint reinforcement or with unit wall ties. Facing shall be anchored to concrete backing with wire dovetail anchors set in slots built in the face of the concrete as specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. The facing wythe shall be anchored or tied to the backup at a maximum spacing of 16 inches on center vertically and 24 inches on center horizontally. Unit ties shall be spaced not over 24 inches on centers horizontally, in courses not over 16 inches apart vertically, staggered in alternate courses. Ties shall be laid not closer than 5/8 inch to either masonry face. Ties shall not

extend through control joints. Collar joints between masonry facing and masonry backup shall be filled solidly with grout.

3.6 MORTAR

Mortar shall be mixed in a mechanically operated mortar mixer for at least 3 minutes, but not more than 5 minutes. Measurement of ingredients for mortar shall be by volume. Ingredients not in containers, such as sand, shall be accurately measured by the use of measuring boxes. Water shall be mixed with the dry ingredients in sufficient amount to provide a workable mixture which will adhere to the vertical surfaces of masonry units. Mortar that has stiffened because of loss of water through evaporation shall be retempered by adding water to restore the proper consistency and workability. Mortar that has reached its initial set or that has not been used within 2-1/2 hours after mixing shall be discarded.

3.7 REINFORCING STEEL

Reinforcement shall be cleaned of loose, flaky rust, scale, grease, mortar, grout, or other coating which might destroy or reduce its bond prior to placing grout. Bars with kinks or bends not shown on the drawings shall not be used. Reinforcement shall be placed prior to grouting. Unless otherwise indicated, vertical wall reinforcement shall extend to within 2 inches of tops of walls.

3.7.1 Positioning Bars

Vertical bars shall be accurately placed within the cells at the positions indicated on the drawings. A minimum clearance of 1/2 inchshall be maintained between the bars and masonry units. Minimum clearance between parallel bars shall be one diameter of the reinforcement. Vertical reinforcing may be held in place using bar positioners located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement. Column and pilaster ties shall be wired in position around the vertical steel. Ties shall be in contact with the vertical reinforcement and shall not be placed in horizontal bed joints.

3.7.2 Splices

Bars shall be lapped a minimum of 48 diameters of the reinforcement. Welded or mechanical connections shall develop at least 125 percent of the specified yield strength of the reinforcement.

3.8 JOINT REINFORCEMENT

Joint reinforcement shall be installed at 16 inches on center or as indicated. Reinforcement shall be lapped not less than 6 inches. Prefabricated sections shall be installed at corners and wall intersections. The longitudinal wires of joint reinforcement shall be placed to provide not less than 5/8 inch cover to either face of the unit.

3.9 PLACING GROUT

Cells containing reinforcing bars shall be filled with grout. Hollow

masonry units in walls or partitions supporting plumbing, heating, or other mechanical fixtures, voids at door and window jambs, and other indicated spaces shall be filled solid with grout. Cells under lintel bearings on each side of openings shall be filled solid with grout for full height of openings. Walls below grade, lintels, and bond beams shall be filled solid with grout. Units other than open end units may require grouting each course to preclude voids in the units. Grout not in place within 1-1/2 hours after water is first added to the batch shall be discarded. Sufficient time shall be allowed between grout lifts to preclude displacement or cracking of face shells of masonry units. If blowouts, flowouts, misalignment, or cracking of face shells should occur during construction, the wall shall be torn down and rebuilt.

3.9.1 Vertical Grout Barriers for Fully Grouted Walls

Grout barriers shall be provided not more than 30 feet apart, or as required, to limit the horizontal flow of grout for each pour.

3.9.2 Horizontal Grout Barriers

Grout barriers shall be embedded in mortar below cells of hollow units receiving grout.

3.9.3 Grouting Equipment

3.9.3.1 Grout Pumps

Pumping through aluminum tubes will not be permitted. Pumps shall be operated to produce a continuous stream of grout without air pockets, segregation, or contamination. Upon completion of each day's pumping, waste materials and debris shall be removed from the equipment, and disposed of outside the masonry.

3.9.3.2 Vibrators

Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the grout. At least one spare vibrator shall be maintained at the site at all times. Vibrators shall be applied at uniformly spaced points not further apart than the visible effectiveness of the machine. Duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing segregation.

3.9.4 Grout Placement

Masonry shall be laid to the top of a pour before placing grout. Grout shall not be placed in two-wythe solid unit masonry cavity until mortar joints have set for at least 3 days during hot weather and 5 days during cold damp weather. Grout shall not be placed in hollow unit masonry until mortar joints have set for at least 24 hours. Grout shall be placed using a hand bucket, concrete hopper, or grout pump to completely fill the grout spaces without segregation of the aggregates. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. The height of grout pours and type of grout used shall be limited by the dimensions of grout spaces as indicated in Table III. Low-lift grout methods may be used

on pours up to and including 5 feet in height. High-lift grout methods shall be used on pours exceeding 5 feet in height.

3.9.4.1 Low-Lift Method

Grout shall be placed at a rate that will not cause displacement of the masonry due to hydrostatic pressure of the grout. Mortar protruding more than 1/2 inch into the grout space shall be removed before beginning the grouting operation. Grout pours 12 inches or less in height shall be consolidated by mechanical vibration or by puddling. Grout pours over 12 inches in height shall be consolidated by mechanical vibration and reconsolidated by mechanical vibration after initial water loss and settlement has occurred. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. Low-lift grout shall be used subject to the limitations of Table III.

3.9.4.2 High-Lift Method

Mortar droppings shall be cleaned from the bottom of the grout space and from reinforcing steel. Mortar protruding more than 1/4 inchinto the grout space shall be removed by dislodging the projections with a rod or stick as the work progresses. Reinforcing, bolts, and embedded connections shall be rigidly held in position before grouting is started. CMU units shall not be pre-wetted. Grout, from the mixer to the point of deposit in the grout space shall be placed as rapidly as practical by pumping and placing methods which will prevent segregation of the mix and cause a minimum of grout splatter on reinforcing and masonry surfaces not being immediately encased in the grout lift. The individual lifts of grout shall be limited to 4 feet in height. The first lift of grout shall be placed to a uniform height within the pour section and vibrated thoroughly to fill all voids. This first vibration shall follow immediately behind the pouring of the grout using an approved mechanical vibrator. After a waiting period sufficient to permit the grout to become plastic, but before it has taken any set, the succeeding lift shall be poured and vibrated 12 to 18 inches into the preceding lift. If the placing of the succeeding lift is going to be delayed beyond the period of workability of the preceding, each lift shall be reconsolidated by reworking with a second vibrator as soon as the grout has taken its settlement shrinkage. The waiting, pouring, and reconsolidation steps shall be repeated until the top of the pour is reached. The top lift shall be reconsolidated after the required waiting period. The high-lift grouting of any section of wall between vertical grout barriers shall be completed to the top of a pour in one working day unless a new series of cleanout holes is established and the resulting horizontal construction joint cleaned. High-lift grout shall be used subject to the limitations in Table III.

TABLE III

POUR HEIGHT AND TYPE OF GROUT FOR VARIOUS GROUT SPACE DIMENSIONS

Minimum Dimensions of the
Total Clear Areas Within Grout
Spaces and Cells (in.) (1,2)

Grout Pour Height	Grout	Grouting	Multiwythe	Hollow-unit
(feet) (4)	Туре	Procedure	Masonry (3)	Masonry
1	Fine	Low Lift	3/4	1-1/2 x 2
5	Fine	Low Lift	2	2 x 3
8	Fine	High Lift	2	2 x 3
12	Fine	High Lift	2-1/2	$2-1/2 \times 3$
24	Fine	High Lift	3	3 x 3
1	Coarse	Low Lift	1-1/2	$1-1/2 \times 3$
5	Coarse	Low Lift	2	$2-1/2 \times 3$
8	Coarse	High Lift	2	3 x 3
12	Coarse	High Lift	2-1/2	3 x 3
24	Coarse	High Lift	3	3 x 4

Notes:

- (1) The actual grout space or cell dimension must be larger than the sum of the following items:
 - a) The required minimum dimensions of total clear areas given in the table above;
 - b) The width of any mortar projections within the space;
 - c) The horizontal projections of the diameters of the horizontal reinforcing bars within a cross section of the grout space or cell.
- (2) The minimum dimensions of the total clear areas shall be made up of one or more open areas, with at least one area being 3/4 inch or greater in width.
- (3) For grouting spaces between masonry wythes.
- (4) Where only cells of hollow masonry units containing reinforcement are grouted, the maximum height of the pour shall not exceed the distance between horizontal bond beams.

3.10 BOND BEAMS

Bond beams shall be filled with grout and reinforced as indicated on the drawings. Grout barriers shall be installed under bond beam units to retain the grout as required. Reinforcement shall be continuous, including around corners, except through control joints or expansion joints, unless otherwise indicated on the drawings. Where splices are required for continuity, reinforcement shall be lapped 48 bar diameters. A minimum clearance of 1/2 inch shall be maintained between reinforcement and interior faces of units.

3.11 CONCRETE MASONRY VENEER CONTROL JOINTS

Brick expansion joints and concrete masonry veneer control joints shall be provided and constructed as shown on the drawings. Joints shall be kept free of mortar and other debris.

3.12 SHELF ANGLES

Shelf angles shall be adjusted as required to keep the masonry level and at the proper elevation. Shelf angles shall be galvanized. Shelf angles shall be provided in sections not longer than 10 feet and installed with a 1/4 inch gap between sections. Shelf angles shall be mitered and welded at building corners with each angle not shorter than 4 feet, unless limited by wall configuration.

3.13 LINTELS

3.13.1 Masonry Lintels

Masonry lintels shall be constructed with lintel units filled solid with grout in all courses and reinforced with a minimum of two No. 4 bars in the bottom course unless otherwise indicated on the drawings. Lintel reinforcement shall extend beyond each side of masonry opening 40 bar diameters or 24 inches, whichever is greater. Reinforcing bars shall be supported in place prior to grouting and shall be located 1/2 inch above the bottom inside surface of the lintel unit.

3.13.2 Precast Concrete and Steel Lintels

Precast concrete and steel lintels shall be as shown on the drawings. Lintels shall be set in a full bed of mortar with faces plumb and true. Steel and precast lintels shall have a minimum bearing length of 8 inches unless otherwise indicated on the drawings.

3.14 SILLS AND COPINGS

Sills and copings shall be set in a full bed of mortar with faces plumb and true.

3.15 ANCHORAGE TO CONCRETE AND STRUCTURAL STEEL

3.15.1 Anchorage to Concrete

Anchorage of masonry to the face of concrete columns, beams, or walls shall be with dovetail anchors spaced not over 16 inches on centers vertically and 24 inches on center horizontally.

3.15.2 Anchorage to Structural Steel

Masonry shall be anchored to vertical structural steel framing with adjustable steel wire anchors spaced not over 16 inches on centers vertically, and if applicable, not over 24 inches on centers horizontally.

3.16 INSULATION

Anchored veneer walls shall be insulated, where shown, by installing board-type insulation on the cavity side of the inner wythe. Board type insulation shall be applied directly to the masonry or thru-wall flashing with adhesive. Insulation shall be neatly fitted between obstructions without impaling of insulation on ties or anchors. The insulation shall be applied in parallel courses with vertical joints breaking midway over the course below and shall be applied in moderate contact with adjoining units without forcing, and shall be cut to fit neatly against adjoining surfaces.

3.17 POINTING AND CLEANING

After mortar joints have attained their initial set, but prior to hardening, mortar and grout daubs or splashings shall be completely removed from masonry-unit surfaces that will be exposed or painted. Before completion of the work, defects in joints of masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Immediately after grout work is completed, scum and stains which have percolated through the masonry work shall be removed using a high pressure stream of water and a stiff bristled brush. Masonry surfaces shall not be cleaned, other than removing excess surface mortar, until mortar in joints has hardened. Masonry surfaces shall be left clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout. Metal tools and metal brushes shall not be used for cleaning.

3.17.1 Concrete Masonry Unit and Concrete Brick Surfaces

Exposed concrete masonry unit and concrete brick surfaces shall be dry-brushed at the end of each day's work and after any required pointing, using stiff-fiber bristled brushes.

3.17.2 Burnished Concrete Masonry Unit Surfaces

Burnished concrete masonry unit surfaces shall be cleaned with soap powder and clean water applied with stiff fiber brushes. Excess mortar shall be removed with wood paddles. Metal cleaning tools, metal brushes, abrasive powders, and acid solutions shall not be used. At the completion of cleaning operations, the surfaces shall be rinsed with clean water. In areas of traffic within the building, a barricade of wood supported by framing lumber shall be erected to protect the units. In other areas, a heavy kraft-type building paper shall be taped over the units until final acceptance.

3.18 WATER REPELLANT

Tuck point and repair cracks or nail holes 1/32 of an inch or larger in any dimension. After concrete masonry has been cleaned and allowed to cure a minimum of 30 days, apply water repellant to exterior concrete masonry work in accordance with manufacturer's instructions.

3.19 SEALING

After concrete masonry has been cleaned and allowed to cure, seal burnished concrete masonry work with one coat of specified sealer applied in strict accordance with manufacturer's recommendations.

3.20 BEARING PLATES

Bearing plates for beams, joists, joist girders and similar structural members shall be set to the proper line and elevation with damp-pack bedding mortar, except where non-shrink grout is indicated. Bedding mortar and non-shrink grout shall be as specified in Section 03300CAST-IN-PLACE STRUCTURAL CONCRETE.

3.21 PROTECTION

Facing materials shall be protected against staining. Top of walls shall be covered with nonstaining waterproof covering or membrane when work is not in progress. Covering of the top of the unfinished walls shall continue until the wall is waterproofed with a complete roof or parapet system. Covering shall extend a minimum of 2 feet down on each side of the wall and shall be held securely in place. Before starting or resuming, top surface of masonry in place shall be cleaned of loose mortar and foreign material.

3.22 TEST REPORTS

3.22.1 Field Testing of Mortar

At least three specimens of mortar shall be taken each day. A layer of mortar 1/2 to 5/8 inch thick shall be spread on the masonry units and allowed to stand for one minute. The specimens shall then be prepared and tested for compressive strength in accordance with ASTM C 780.

3.22.2 Field Testing of Grout

Field sampling and testing of grout shall be in accordance with the applicable provisions of ASTM C 1019. A minimum of three specimens of grout per day shall be sampled and tested. Each specimen shall have a minimum ultimate compressive strength of 2000 psi at 28 days.

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SECTION 05055

METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS ${\bf 06/02}$

PART 1 GENERAL

1.1 Stoplogs

An alternative aluminum stoplog shape and seal along with alternative galvanized steel supports, sill plate, and side slots may be proposed by the Contractor for the review and approval of the Contracting Officer.

1.2 Expansion Joint Type "A" Cover Plate Painting

Painting of expansion joint type "A" cover plates will be required. Cover plate painting shall be performed not only for the joints on structures constructed on the Phase 2 Levees project, but also on the 39 expansion joint type "A" cover plates installed on structures constructed in Phase 1. These joints are located at the closure structures at 4th Street, 12th Street, Bygland Road, Pump Station K-12, and the Arena Floodwall.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION

AA SAS-30

(1986) Aluminum Structures Constructino Manual Series - Section 1 Specifications for Aluminum Structures

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO

(1978) Guide Specifications for Fracture Critical Non-Redundant Bridge Members

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A 14.3

(1992) Ladders-Fixed-Safety Requirements

ANSI MBG 531

(1993) Metal Bar Grating Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 6

(1999) General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use

ASTM A 36	(1997) Carbon Structural Steel
ASTM A 53	(1996) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 108	(1995) Specification for Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(1995) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 167	(1992b) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A 176	(1993a) Stainless and Heat Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 240	(1993) Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
ASTM A 276	(1996) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 307	(1997) Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 325	(1994) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 380	(1994a) Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems
ASTM A 449	(2000) Standard Specification for Quenched and Tempered Steel Bolts and Nuts
ASTM A 500	(1993) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 563	(1996) Specification for Carbon and Alloy Steel Nuts
ASTM A 564	(1995) Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
ASTM A 569	(1998) Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet

	and Strip Commercial Quality
ASTM A 572	(1997) Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 709	(2001) Carbon and High-Strength Low-Alloy Structural Steel Shapes, Plates and Bars and Quenched - and - Tempered Alloy Steel Plate for Bridges
ASTM A 1011	(2000) Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
ASTM B 221	(1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
ASTM 308	(1995a) Aluminum-Alloy 6061-T6 Standard Structural Shapes
ASTM F 593	(1998) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(1998) Stainless Steel Nuts
ASTM B 429	(1995) Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM D 395	(1989; R 1994) Rubber Property - Compression Set
ASTM D 412	(1992) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 413	(1982; R 1993) Rubber Property - Adhesion to Flexible Substrate
ASTM D 471	(1995) Rubber Property - Effect of Liquids
ASTM D 572	(1988; R 1994) Rubber - Deterioration by Heat and Oxygen
ASTM D 2240	(1995) Rubber Property - Durometer Hardness
ASTM E 32	(1996) Practices for Sampling Ferroalloys and Steel Additives for Determination of Chemical Composition

ASTM E 165	(1995) Liquid Penetrant Examination Inspection Method
ASTM E 709	(1995) Magnetic Particle Examination
ASTM F 436	(1993) Specification for Hardened Steel Washers
ASME INTERNATIONAL (ASM	IE)
ASME B4.1	(1967; R 1994) Preferred Limits and Fits for Cylindrical Parts
ASME B18.2.2	(1989; R 1993) Square and Hex Nuts (Inch Series)
ASME B18.3	(1989; R 1995) Socket Cap, Shoulder and Set Screws (Inch Series) Including Dimensions of Hexagon and Spline Sockets
ASME B18.6.2	(1972; R 1993) Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws
ASME B18.6.3	(1972; R 1991) Machine Screws and Machine Screw Nuts
ASME B18.21.1	(1994) Lock Washers (Inch Series)
ASME B18.22.1	(1965; R 1990) Plain Washers
ASME B18.22M	(1981; R 1990) Metric Plain Washers
ASME B27.7	(1977; R 1993) General Purpose Tapered and Reduced Cross Section Retaining Rings
ASME BPV IX	(1995) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications
NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)	
NAAMM MBG 531	(1993) Metal Bar Grating Manual
NAAMM MBG 532	(1988) Heavy Duty Metal Bar Grating Modulal
AMERICAN WELDING SOCIETY (AWS)	
AWS C5.5	(1980) Recommended Practices for Gas Tungsten Arc Welding
AWS D1.1	(2000) Structural Welding Code - Steel

AWS D1.2 (1990) Structural Welding Code-Aluminum

AWS D1.5 (1995) Bridge Welding Code

AWS D1.6 (1999) Structural Welding Code - Stainless

Steel

U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

OSHA 29 CFR 1910 OSHA Safety and Health Standard for

General Industry

SOCIETY OF PROTECTIVE COATINGS (SSPC)

SSPC-SP1 Solvent Cleaning

SSPC-PA2 Measurement of Dry Coating Thickness with

Magnetic Gages

1.4 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-01 Data

Product Data Sheet; GA

Submit paint manufacturer's current product data for approval prior to base metal preparation.

SD-04 Drawings

Detail Drawings; GA.

Detail drawings for metalwork and machine work shall be submitted and approved prior to fabrication.

SD-07 Schedules

Materials Orders; FIO.

Copies of purchase orders, mill orders, shop orders and work orders for materials shall be submitted prior to the use of the materials in the work.

Materials List; FIO.

Materials list for fabricated items shall be submitted at the time of submittal of detail drawings.

Shipping Bill; FIO.

Shipping bill shall be submitted with the delivery of finished pieces to the site.

SD-08 Statements

Welding Procedures for Structural Steel; FIO.

Schedules of welding procedures for steel structures shall be submitted and approved prior to commencing fabrication.

Welding of Aluminum; FIO.

Schedules of welding processes for aluminum fabrications shall be submitted and approved prior to commencing fabrication.

Structural Steel Welding Repairs; FIO.

Welding repair plans for steel shall be submitted and approved prior to making repairs.

Fracture Control Plan (FCP); GA

Welding procedures, qualifications, and certifications shall be submitted showing compliance with FCP requirements.

SD-09 Reports

Tests, Inspections, and Verifications; FIO.

Certified test reports for materials shall be submitted with all materials delivered to the site.

Test Reports for Fracture Critical Members (FCM); GA.

Bound report shall contain test results on all fracture critical members and shall include record of personnel qualifications, equipment, procedures, and analysis of results along with all the test records. Report shall cover the Charpy V-notch tests, all welding tests, and chemical and mechanical properties of the steel.

SD-13 Certificates

Qualification of Welders and Welding Operators; FIO.

Certifications for welders and welding operators shall be submitted prior to commencing fabrication.

Application Qualification for Steel Studs; FIO.

Certified reports for the application qualification for steel studs shall be submitted and approved prior to commencing fabrication.

Welding of Aluminum; FIO.

Certified report for aluminum welding qualification tests shall be submitted and approved prior to commencing welding.

SD-18 Records

Materials Disposition Records; FIO.

Materials disposition records shall be submitted before completion of contract.

1.5 METALWORK AND MACHINE WORK DETAIL DRAWINGS

Detail drawings for metalwork and machine work shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of material as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the detail drawings.

1.6 QUALIFICATION OF WELDERS AND WELDING OPERATORS

The Contractor shall certify that the qualification of welders and welding operators and tack welders who will perform structural steel welding have been qualified for the particular type of work to be done in accordance with the requirements of AWS D1.1, or ASME BPV IX, Section IX, unless specified otherwise, prior to commencing fabrication. The certificate shall list the qualified welders by name and shall specify the code and procedures under which qualified and the date of qualification. Prior qualification will be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. The Contractor shall require welders to repeat the qualifying tests when their work indicates a reasonable doubt as to proficiency. Those passing the requalification tests will be recertified. Those not passing will be disqualified until passing. All expenses in connection with qualification and requalification shall be borne by the Contractor.

1.7 FRACTURE CONTROL PLAN (FCP)

A FCP is required and shall be submitted for welding on all Fracture Critical Members (FCM) and shall be in accordance with AWS D1.5, Section 12. The Contractor shall show that these requirements can be met through proper certification and documentation.

1.8 DELIVERY, STORAGE AND HANDLING

1.8.1 Galvanized Steel Items

Galvanized steel items shall be stored in a dry location with spacers to separate the pieces from the ground and each other.

1.8.2 Rubber Seals

Rubber seals shall be stored in a place which permits free circulation of

air, maintains a temperature of 70 degrees F or less, and prevents the rubber from being exposed to the direct rays of the sun. Rubber seals shall be kept free of oils, grease, and other materials which would deteriorate the rubber. Rubber seals shall not be distorted during handling.

1.8.3 Paint

Paint shall be stored to protect it from freezing and excessive heat. The paint shall be kept in original sealed containers until ready for application.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Materials Orders

The Contractor shall furnish 3 copies of purchase orders, mill orders, shop orders and work orders for all materials orders and items used in the work. Where mill tests are required purchase orders shall contain the test site address and the name of the testing agency.

2.1.2 Materials List

The Contractor shall furnish a materials list of the materials to be used in the fabrication of each item.

2.1.3 Shipping Bill

The Contractor shall furnish a shipping bill or memorandum of each shipment of finished pieces or members to the project site giving the designation mark and weight of each item, the number of items, the total weight, and the car initial and number if shipped by rail in carload lots. Duplicate copies of shipping bills shall be mailed promptly to the Contracting Officer.

2.1.4 Miscellaneous Metals and Standard Articles

2.1.4.1 Structural Steel

General: ASTM A 36, ASTM A 709, Grade 50, or ASTM A 572, Grade 50, as indicated. Galvanized after fabrication.

FCM: Base metal for FCM shall meet requirements of AWS D1.5, Chapter 12 and as noted on the drawings.

2.1.4.2 Steel Tubing

ASTM A 500, Grade B , welded, outside dimensions and nominal wall thickness as shown. Galvanized after fabrication.

2.1.4.3 Steel Pipe and Pipe Fittings

ASTM A 53, Type E, Grade B, electric-resistance welded, galvanized, nominal

size and weight class or outside diameter and nominal wall thickness as shown with plain ends.

2.1.4.4 Bars and Shapes

Stainless steel bars and shapes shall conform to the following as specified or shown:

- a. ASTM A 276, UNS S30400, Condition A, hot-finished or cold-finished, Class C.
- b. ASTM A 564, UNS S17400 or S45000, age-hardened heat treatment condition, hot-finished or cold-finished, Class C.

2.1.4.5 Threaded Rod

Steel Rod

ASTM A 449, galvanized after fabrication.

Stainless Steel Rod

ASTM A 276, Strain hardened, type 316 with minimum yield strength of 75 ksi and minimum ultimate strength of 95 ksi.

2.1.4.6 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall be of the material, grade, type, class, style and finish indicated or best suited for intended use.

High-Strength Bolts, Nuts, and Washers

Bolts: ASTM A 325, Type 1, hot-dip galvanized. Nuts: ASTM A 563, hot-dip galvanized.

Bolts, Nuts, and Washers (Other than High-Strength)

- a. Bolts and Nuts ASTM A 307, Grade A, hot-dip galvanized.
- b. Bolts ASME B18.2.1.
- c. Nuts ASME B18.2.2.
- d. Washers
- (1) Plain Washers ASME B18.22M ASME B18.22.1, Type B.
- (2) Lock Washer ASME B18.21.1.
- (3) Beveled Washers ASTM F 436, Beveled.

2.1.4.7 Screws

Screws shall be of the material, grade, type, style, and finish indicated or best suited for use intended.

Cap Screw

ASME B18.2.1, ASME B18.3, or ASME B18.6.2 as required.

Machine Screws

ASME B18.6.3.

2.1.4.8 Welded Shear Studs

ASTM E 108, minimum yield strength of 50 ksi, minimum ultimate strength of 55 ksi.

2.1.4.9 Welding Electrodes

AWS D1.1, E70 Series or as required by AWS Specification. Consumables used on FCM shall meet requirements of AWS D1.5, Chapter 12.

2.1.4.10 Aluminum

Alloy 6061-T6

a. ASTM B 221 and ASTM B 429 for bars, rods, wires, pipes and tubes.

Electrodes for welding aluminum: AWS D1.2, filler alloy 4043 or 5356.

2.1.4.11 Embedded Anchor Bolts, Expansion Anchor Bolts, Adhesive Anchor Bolts

Material: ASTM F 593 Stainless steel, Type 304 or 316. Provide Type 316 unless noted otherwise. Provide minimum edge distance cover and spacing as recommended by manufacturer, or as indicated on Drawings whichever is larger. Depth of embedment: minimum embedment as recommended by manufacturer or nine diameters of bolt, whichever is larger. Notify Contracting Officer if required depth of embedment cannot be achieved at a particular anchor bolt location. Follow manufacturer's recommendations for installation and torque.

Submit manufacturer's load test data to verify at least the anchor bolt capacities at the following embedment depths: (Data must be based on actual tests performed in unreinforced mass concrete of not more than 4000 psi compressive strength. Capacity must be at a concrete temperature of at least 130 Degrees F).

ANCHOR BOLT EMBEDMENT & CAPACITY

ANCHOR BOLT	MINIMUM	MINIMUM ULTIMATE
DIAMETER	EMBEDMENT (IN)	TENSION CAPACITY (KIP)
1/2	4-1/2	8.1
5/8	5-5/8	11.4
3/4	6-3/4	15.4
7/8	7-7/8	20.1
1	9	24.1
1-1/4	11-1/4	34.3

2.1.4.12 Galvanizing Repair Paint

High zinc dust content paint for regalvanizing welds and abrasions. Dried film shall contain not less than 83 percent zinc dust by weight.

2.1.4.13 Cast Iron Castings

Cast iron castings for stoplog attachment covers and frames shall be as specified for manhole frame and cover in SECTION 02630: STORM-DRAINAGE SYSTEM.

2.1.5 Rubber Seal Pad and Adhesive

Rubber seal material shall be fabricated from material having the same characteristics and material properties as one of the following products. The adhesive used to bond the material to the stoplog shall be as recommended by the manufacturer and as submitted and approved.

- 1) Compound PO-655 as manufactured by Custom Urethane Elastomers, Inc.
- 2) Product 75a as manufactured by Seals Unlimited Inc.
- 3) Keelshield (smooth surface) as manufactured by Wendt Productions Inc.

2.1.6 MANUFACTURED UNITS

2.1.6.1 Steel Grating

ANSI MBG 531. Critical depth, bar thickness and spacing shall be as shown on the Drawings. Cross bars: Welded, swagged or pressure locked to bearing beam, maximum spacing 4 IN/OC. Top edges of bars: Smooth unless shown otherwise on the Drawings. Individual grating sections: not wider than 3 FT. Finish: Hot-dip galvanized. Clips and bolts: Stainless steel or hot-dip galvanized, minimum 4 per grate section. Ends and perimeter edges: No banding required except where shown on the Drawings. Openings through grating: Reinforced to provide required load carrying capacity.

2.1.6.2 Stoplogs

Stoplogs shall be fabricated from aluminum tubes to the dimensions indicated on the drawings. Rubber seals shall be bonded to the stoplogs as indicated on the drawings with an adhesive recommended by the manufacturer of the seal material, and as approved, and suited to the use intended. The pades shall also be attached with screws to the stoplogs as indicated on the drawings.

2.1.6.3 Stoplog Tie Down Straps

Two-piece, 2" wide polyester webbed straps with flat hook on each end. Rachet buckle for tightening. Minimum working load shall be 1000 lb. Minimum length of 20 feet.

2.1.7 Paint Materials

Paint shall be one of the primer and finish combinations listed below. The color shall match that of the adjacent concrete cap and meet the approval of the Contracting Officer.

Sherwin Williams Company: Primer: DTM Primer/Finish; Finish: DTM Acrylic Series B66-220 semi-gloss.

Devoe Devflex: Primer: 4020; Finish: 4206 semi-gloss.

Tnemec: Primer: Series 6; Finish: Series 7 semi-gloss.

2.2 FABRICATION

Provide each fabricated item complete with attachment devices as indicated or required to install.

2.2.1 Structural Fabrication

Structural steel shapes and plate shall be ASTM A36 galvanized, unless noted otherwise on Drawings. Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on detail drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

2.2.1.1 Dimensional Tolerances for Structural Work

Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/32 inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown by not more than 1/16 inch for members 30 feet or less in length and by more than 1/8 inch for members over 30 feet in length. Finished members shall be free from twists, bends and open joints. Sharp kinks, bends and deviation from above tolerances are cause for rejection of material. Comply with requirements of applicable building codes and AISC Specification with modifications and additional requirements specified herein.

2.2.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Hand-guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal. Minimize the amount of field welding, shop assemble components into largest size possible commensurate with transportation and handling limitations.

2.2.1.3 Stoplog Grooves and Sill

Extra care shall be taken in the fabrication and installation of the stoplog grooves and sills to ensure that leakage is kept to a minimum. If leakage is excessive and misalignment of the grooves and/or sills, or their component parts, is a contributing factor to the leakage, the Contractor shall propose corrective measures and shall implement corrective measures at no additional cost to the Government. Stoplog groove and end sill surfaces in contact with concrete shall be coated with a bonding agent equal to Sika Armatec 110.

2.2.1.4 Fracture Critical Members (FCM)

All steel used in FCM shall be as noted on the drawings and shall meet base and weld metal toughness requirements of AWS D1.5, Section 12

2.2.2 Welding

2.2.2.1 Welding of Structural Steel

a. Welding Procedures for Structural Steel - Welding procedures for structural steel shall be prequalified as described in AWS D1.1, or shall be qualified by tests as prescribed in AWS D1.1. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish a welding procedure as prequalified. For welding procedures qualified by tests, the test welding and specimen testing must be witnessed and the test report document signed by the Contracting Officer. Approval of any welding procedure will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contractor Officer. The Contractor shall submit a complete schedule of welding procedures for each steel structure to be welded. The schedule shall conform to the requirements specified in the provisions AWS D1.1. schedule shall provide detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Welding procedures must include filler metal, preheat, interpass temperature and stress-relief heat treatment requirements. Each

welding procedure shall be clearly identified as being prequalified or required to be qualified by tests. Welding procedures must show types and locations of welds designated or in the specifications to receive nondestructive examination. Welding procedures for FCM shall be in accordance with AWS D1.5, Section 12.

b. Welding Process - Welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the molten metal and shall conform to the applicable provisions of AWS D1.1. Welding shall be such as to minimize residual stresses, distortion and shrinkage. Each welder shall use identifying mark at welds. Welding processes for FCM shall be in accordance with AWS D1.5, Section 12.

c. Welding Technique

- (1) Filler Metal The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used or shall be as shown where a specific choice of AWS specification allowables is required. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. A controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1, to maintain low moisture of low hydrogen electrodes. Filler metal for FCM shall be in accordance with AWS D1.5, Section 12.
- (2) Preheat and Interpass Temperature Preheating shall be performed as required by AWS D1.1, or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, hold at that temperature until the welding is completed and then permitted to cool slowly in still air. Do not perform welding when ambient temperature is lower than 0 degrees F or where surfaces are wet or exposed to rain, snow, or high wind, or when welders are exposed to inclement conditions. Preheat and interpass temperatures for FCM shall be in accordance with AWS D1.5, Section 12.
- (3) Stress-Relief Heat Treatment Where stress relief heat treatment is specified or shown, it shall be in accordance with the requirements of AWS D1.1. Postweld thermal treatment for FCM shall be in accordance with AWS D1.5, Section 12.
- d. Workmanship Workmanship for welding shall be in accordance with AWS D1.1.
 - (1) Preparation of Base Metal Prior to welding the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1. Preparation of base metal for FCM shall be in accordance with applicable sections of AWS D1.5.

- (2) Temporary Welds Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed for permanent work. Temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Preheating for temporary welds shall be as required by AWS D1.1 for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds arcs shall not be struck in other than weld locations. Each temporary weld shall be removed and ground flush with adjacent surfaces after serving its purpose. Temporary welds on FCM shall be in accordance with applicable sections of AWS D1.5.
- (3) Tack Welds Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds and shall be cleaned and thoroughly fused with permanent welds. Preheating shall be performed as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding. Tack welds on FCM shall be in accordance with applicable sections of AWS D1.5.

2.2.2.2 Welding of Aluminum

Welding of aluminum shall conform to AA SAS-30 or AWS D1.2. The welding process and welding operators shall be prequalified as required by AWS D1.2. A certified report giving the results of the qualifying tests shall be furnished for approval. A complete schedule of the welding process for each aluminum fabrication to be welded shall be furnished for approval.

2.2.2.3 Welding of Steel Studs

The procedures for welding steel studs to structural steel, including mechanical, workmanship, technique, stud application qualification, production quality control and fabrication and verification inspection procedures shall conform to the requirements of AWS D1.1, Section 7, except as otherwise specified.

- a. Application Qualification for Steel Studs As a condition of approval of the stud application process, the Contractor shall furnish certified test reports and certification that the studs conform to the requirements of AWS D1.1, Subsections 7.2 and 7.3, certified results of the stud manufacturer's stud base qualification test, and certified results of the stud application qualification test as required by AWS D1.1, Subsection 7.6, except as otherwise specified.
- b. Production Quality Control Quality control for production welding of studs shall conform to the requirements of AWS D1.1, subsection 7.7, except as otherwise specified. Studs on which pre-production testing is to be performed shall be welded in the same general position as required on production studs (flat, vertical, overhead, or sloping). If the reduction of the length of studs becomes less than normal as they are welded, welding shall be stopped immediately and not resumed

until the cause has been corrected.

2.2.2.4 Welding of Stainless Steel

Welding of stainless steel shall follow all requirements of AWS D1.6 unless otherwise specified or directed by the Contracting Officer.

2.2.3 Bolted Connections

2.2.3.1 Bolted Structural Steel Connections

- a. Bolt Holes Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical. Do not make or enlarge holes by burning.
 - (1) Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16 inch larger than the diameter of the bolt.
 - (2) Holes for fitted bolts shall be match-reamed or drilled in the shop. Burrs resulting from reaming shall be removed. The threads of bolts shall be entirely outside of the holes. The body diameter of bolts shall have tolerances as recommended by ASME B4.1 for the class of fit specified. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.
 - (3) Holes for high strength bolts shall have diameters of not more than 1/16 inch larger than bolt diameters. If the thickness of the material is not greater than the diameter of the bolts the holes may be punched. If the thickness of the material is greater than the diameter of the bolts the holes may be drilled full size or subpunched or subdrilled at least 1/8 inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting occurring during assembly shall not distort the metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

2.2.3.2 Bolted Aluminum Connections

Punching, drilling, reaming and bolting for bolted aluminum connections shall conform to the requirements of AA SAS-30, Section 6.

2.2.4 Machine Work

Tolerances, allowances and gauges for metal fits between plain, non-threaded, cylindrical parts shall conform to ASME B4.1 for the class of fit shown or required unless otherwise shown on approved detail drawings. Where fits are not shown they shall be suitable as approved. Tolerances for machine-finished surfaces designated by non-decimal dimensions shall be within 1/64 inch. Sufficient machining stock shall be allowed on placing pads to ensure true surfaces of solid material. Finished contact or bearing surfaces shall be true and exact to secure full contact. Journal surfaces shall be polished and all surfaces shall be finished with

sufficient smoothness and accuracy to ensure proper operation when assembled. Parts entering any machine shall be accurately machined and all like parts shall be interchangeable except that parts assembled together for drilling or reaming of holes or machining will not be required to be interchangeable with like parts. All drilled bolt holes shall be accurately located.

2.2.4.1 Unfinished Surfaces

All work shall be laid out to secure proper matching of adjoining unfinished surfaces unless otherwise directed. Where there is a large discrepancy between adjoining unfinished surfaces they shall be chipped and ground smooth or machined to secure proper alignment. Unfinished surfaces shall be true to the lines and dimensions shown and shall be chipped or ground free of all projections and rough spots. Depressions or holes not affecting the strength or usefulness of the parts shall be filled in an approved manner.

2.2.5 Miscellaneous Provisions

2.2.5.1 Metallic Coatings

a. Zinc Coatings - Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. Where zinc coatings are destroyed by cutting, welding or other causes the affected areas shall be regalvanized. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating. Coatings less than 2 ounces shall be repaired in accordance with ASTM A 780.

2.2.6 Shop Assembly

Each machinery and structural unit furnished shall be assembled in the shop to determine the correctness of the fabrication and matching of the component parts unless otherwise specified. Tolerances shall not exceed those shown. Each unit assembled shall be closely checked to ensure that all necessary clearances have been provided and that binding does not occur in any moving part. Assembly in the shop shall be in the same position as final installation in the field unless otherwise specified. Assembly and disassembly work shall be performed in the presence of the Contracting Officer unless waived in writing. Errors or defects disclosed shall be immediately remedied by the Contractor without cost to the Government. Before disassembly for shipment each piece of a machinery or structural unit shall be match-marked to facilitate erection in the field. The location of match-marks shall be indicated by circling with a ring of white paint after the shop coat of paint has been applied or as otherwise directed.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

The Contractor shall have required material tests and analyses performed and certified by an approved laboratory to demonstrate that materials are

in conformity with the specifications. These tests and analyses shall be performed and certified at the Contractor's expense. Tests, inspections, and verifications shall conform to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Tests shall be conducted in the presence of the Contracting Officer if so required. The Contractor shall furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Specimens and samples shall be properly labeled and prepared for shipment.

2.3.1 Nondestructive Testing

When doubt exists as to the soundness of any material part such part may be subjected to any form of nondestructive testing determined by the Contracting Officer. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government. Any defects will be cause for rejection and rejected parts shall be replaced and retested at the Contractor's expense.

2.3.2 Tests of Machinery and Structural Units

The details for tests of machinery and structural units shall conform to the requirements of the particular sections of these specifications covering these items. Each complete machinery and structural unit shall be assembled and tested in the shop in the presence of the Contracting Officer unless otherwise directed. Waiving of tests will not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site each complete machinery or structural unit shall be operated through a sufficient number of complete cycles to demonstrate to the satisfaction of the Contracting Officer that it meets the specified operational requirements in all respects.

2.3.3 Inspection of Structural Steel Welding

The Contractor shall maintain an approved inspection system and perform required inspections in accordance with Contract Clause CONTRACTOR INSPECTION SYSTEM. Welding shall be subject to inspection to determine conformance with the requirements of AWS D1.1, the approved welding procedures and provisions stated in other sections of these specifications. Nondestructive examination of designated welds will be required. Supplemental examination of any joint or coupon cut from any location in any joint may be required.

2.3.3.1 Visual Examination

All visual examination of completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.1.

2.3.3.2 Nondestructive Examination

The nondestructive examination of shop and field welds shall be performed as designated or described in the sections of these specifications covering the particular items of work. Ten percent of all welds shall be tested.

- a. Testing Agency The nondestructive examination of welds and the evaluation of examination tests as to the acceptability of the welds shall be performed by a testing agency adequately equipped and competent to perform such services or by the Contractor using suitable equipment and qualified personnel. In either case written approval of the examination procedures is required and the examination tests shall be made in the presence of the Contracting Officer. The evaluation of examination tests shall be subject to the approval and all records shall become the property of the Government.
- b. Examination Procedures Examination procedures shall conform to the following requirements.
 - (1) Ultrasonic Testing Making, evaluating and reporting ultrasonic testing of welds shall conform to the requirements of AWS D1.1. The ultrasonic equipment shall be capable of making a permanent record of the test indications. A record shall be made of each weld tested.
 - (2) Radiographic Testing Making, evaluating and reporting radiographic testing of welds shall conform to the requirements of AWS D1.1.
 - (3) Magnetic Particle Inspection Magnetic particle inspection of welds shall conform to the applicable provisions of ASTM E 709.
 - (4) Dye Penetrant Inspection Dye penetrant inspection of welds shall conform to the applicable provisions of ASTM E 165.
- c. Acceptability of Welds Welds shall be unacceptable if shown to have defects prohibited by AWS D1.1, Subsection 9.25 or possess any degree of incomplete fusion, inadequate penetration or undercutting.
- d. Welds to be Subject to Nondestructive Examination All welds on FCM require nondestructive examination. All welds shall be examined by visual inspection and magnetic-particle testing. All butt joints shall be examined by both radiographic and ultrasonic testing. All other groove welds shall be tested by ultrasonic testing.

2.3.3.3 Test Coupons

The Government reserves the right to require the Contractor to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive examination. Should tests of any two coupons cut from the work of any welder show strengths less than that specified for the base metal it will be considered evidence of negligence or incompetence and such welder shall be removed from the work. When coupons are removed from any part of a structure the members cut shall be repaired in a neat manner with joints of the proper type to develop the full strength of the members. Repaired joints shall be peened as approved or directed to relieve residual

stress. The expense for removing and testing coupons, repairing cut members and the nondestructive examination of repairs shall be borne by the Government or the Contractor in accordance with the Contract Clauses INSPECTION AND ACCEPTANCE.

2.3.3.4 Testing Fracture Critical Members (FCM)

Weld testing, inspection, and personnel qualifications and certification of FCM shall be in accordance with AWS D1.5, Section 12. Copies of the weld inspector's certification and qualifications for all assistant inspectors shall be submitted. All members designated as FCM shall have their joints tested.

2.3.3.5 Supplemental Examination

When the soundness of any weld is suspected of being deficient due to faulty welding or stresses that might occur during shipment or erection the Government reserves the right to perform nondestructive supplemental examinations before final acceptance. The cost of such inspection will be borne by the Government.

2.3.4 Structural Steel Welding Repairs

Defective welds in the structural steel welding repairs shall be repaired in accordance with AWS D1.1. Defective weld metal shall be removed to sound metal by use of air carbon-arc or oxygen gouging. The surfaces shall be thoroughly cleaned before welding. Welds that have been repaired shall be retested by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds costs of repairs and retesting shall be borne by the Contractor. Repairs on FCM shall be in accordance with AWS D1.5, Chapter 12.

2.3.5 Inspection and Testing of Steel Stud Welding

Fabrication and verification inspection and testing of steel stud welding shall conform to the requirements of AWS D1.1, except as otherwise specified. The Contracting Officer will serve as the verification inspector. One stud in every 100 and studs that do not show a full 360-degree weld flash, have been repaired by welding or whose reduction in length due to welding is less than normal shall be bent or torque tested as required by AWS D1.1. If any of these studs fail, two additional studs shall be bent or torque tested. If either of the two additional studs fail, all of the studs represented by the tests shall be rejected. Studs that crack under testing in either the weld, base metal, or shank shall be rejected and replaced by the Contractor at no additional cost to the Government.

PART 3 EXECUTION

3.1 INSTALLATION

All parts to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Holes and

grooves for lubrication shall be cleaned. Where units or items are shipped as assemblies they will be inspected prior to installation. Disassembly, cleaning and lubrication will not be required except where necessary to place the assembly in a clean and properly lubricated condition. Pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts shall not be used for assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly but care shall be taken not to overstress the threads. When a half nut is used for locking a full nut the half nut shall be placed first and followed by the full nut. Threads of all bolts except high strength bolts, nuts and screws shall be lubricated with an approved lubricant before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with an approved antigalling compound. Driving and drifting bolts or keys will not be permitted. After erection, grind smooth all sharp surface irregularities resulting from field cutting or welding; power tool clean welds, bolts, washers and abrasions to shop coat removing all rust and foreign matter.

3.1.1 Alignment and Setting

Each machinery or structural unit shall be accurately aligned by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place. The alignment of all parts with respect to each other shall be true within the respective tolerances required. Machines shall be set true to the elevations shown.

3.1.2 Blocking and Wedges

All blocking and wedges used during installation for the support of parts to be grouted in foundations shall be removed before final grouting unless otherwise directed. Blocking and wedges left in the foundations with approval shall be of steel or iron.

3.1.3 Expansion Anchor Bolts and Adhesive Anchor Bolts

Install in strict accordance with manufacturer's instructions for hole size, hole cleaning, installation, torque requirements substrate temperature and curing. Use only carbide-tipped drilling equipment.

3.1.4 Bolted Connections

Install ASTM A 325 bolts with hardened washers. Install and tighten in accordance with Section 8 of Specifications for Structural Joints. Coordinate installation with inspection. Do not start installation until coordination with Testing Agency is complete. Slip critical connections: Perform calibration testing for all methods of installation of high-strength bolts in accordance with Section 8(b) of Specification for Structural Joints, using ASTM A 325 bolts.

- 1. Turn-of-nut tightening: Torque wrenches shall be used only by laboratory personnel.
- 2. Calibrated wrench tightening: Calibrate on a daily basis.

- 3. Direct tension indicator tightening: If previously approved by Contracting Officer.
- 4. Installation of alternate design bolts: If previously approved by Contracting Officer.

In the event any bolt in a connection is found to be defective, check and retighten all bolts in the connection.

Do not use gas cutting to correct fabrication errors. In case members do not fit or holes do not match, ream out the holes and insert the next larger size bolt. If the connections require new holes, then drill new holes. Make no such corrections without prior approval of the Contracting Officer. Burning of holes: Not permitted.

Tighten and leave in place erection bolts used in welded construction. Provide beveled washers to give full bearing to bolt head or nut where bolts are to be used on surfaces having slopes greater than 1 in 20 with a plane normal to bolt axis.

After bolts are tightened, upset threads of A 307 unfinished bolts and anchor bolts to prevent nuts from backing off.

3.1.5 Steel Grating

Attach grating to end and intermediate supports with grating saddle clips and bolts. Maximum spacing: at 2 Feet on-centers with a minimum of two per side. Attach individual units of grating together with clips at 2 feet on centers maximum with a minimum of two clips per side.

3.1.6 Painting

Painting of the expansion joint type "A" cover plates is to include all joints of this type in this Phase as well as those installed in the earlier Phase 1. The quantity and location of the joints in Phase 1 is listed in PARAGRAPH: GENERAL of this specification section. Paint is to be applied to the 14 gage galvanized steel cover plate and the attachment bolts and plate. The portions of the joint below the ground line and the top plate is not to be painted.

3.1.6.1 Surface Preparation

The surface is to be solvent cleaned in accordance with SSPC-SP1 and scarified by sanding or light sandblasting. The galvanized coating shall not be cut through with the cleaning effort.

3.1.6.2 Application

The paint shall be applied in accordance with the manufacturer's printed instructions with a minimum of one coat of primer and one finish coat. Dry film thickness of each coat is to be 2.5 - 4.0 mils as measured in accordance with SSPC-PA2. The areas not to receive paint shall be masked and shielded from overspray and splatters. The painted surface shall be

free from runs, sags, dry spray, embedded particles, and missed areas.

3.2 PROTECTION OF FINISHED WORK

3.2.1 Machined Surfaces

Machined surfaces shall be thoroughly cleaned of foreign matter. All finished surfaces shall be protected by suitable means. Unassembled pins and bolts shall be oiled and wrapped with moisture resistant paper or protected by other approved means. Finished surfaces of ferrous metals to be in bolted contact shall be washed with an approved rust inhibitor and coated with an approved rust resisting compound for temporary protection during fabrication, shipping and storage periods. Finished surfaces of metals which shall be exposed after installation except galvanized steel or nonferrous metals shall be painted as specified in SECTION 09900: PAINTING, GENERAL.

3.2.2 Galvanized Surfaces

Repair damaged galvanized surfaces in accordance with ASTM A 780. Prepare damaged surfaces by abrasive blasting or power sanding. Apply galvanizing repair paint in accordance with manufacturer's instructions. Minimum thickness: larger of 6 mils DFT or manufacturer's standard.

3.3 TESTS

3.3.1 Workmanship

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

3.3.2 Production Welding

Production welding shall conform to the requirements of AWS D1.1, AWS D1.2, AWS D1.5, or AWS D1.6 as applicable.

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SECTION 05300

STEEL DECKING 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC ASD Spec (1989) Specification for Structural Steel
Buildings - Allowable Stress Design and
Plastic Design

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI Cold-Formed Mnl (1996) Cold-Formed Steel Design Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 108	(1995) Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 570/A 570M	(1996) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 611	(1997) Structural Steel (SS), Sheet, Carbon, Cold-Rolled
ASTM A 653/A 653M	(1997) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 792/A 792M	(1997) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM C 423	(1990a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
ASTM E 795	(1993) Mounting Test Specimens During

Sound Absorption Tests

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 (1998) Structural Welding Code - Steel

AWS D1.3 (1998) Structural Welding Code - Sheet

Steel

STEEL DECK INSTITUTE (SDI)

SDI Diaphram Mnl (1987; Amended 1991) Diaphragm Design

Manual

SDI Pub No 30 (2001) Design Manual for Composite Decks,

Form Decks, Roof Decks

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC Paint 20 (1991) Zinc-Rich Primers (Type I -

Inorganic and Type II - Organic)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals not having a "GA" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Deck Units; FIO.

Design computations for the structural properties of the deck units or SDI certification that the units are designed in accordance with SDI specifications.

SD-04 Drawings

Deck Units; FIO. Accessories; FIO.

Drawings shall include type, configuration, structural properties, location, and necessary details of deck units, accessories, and supporting members; and the manufacturer's erection instructions.

SD-13 Certificates

Deck Units; FIO.

Manufacturer's certificates attesting that the decking material meets the specified requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

Deck units shall be delivered to the site in a dry and undamaged condition,

stored off the ground with one end elevated, and stored under a weathertight covering permitting good air circulation. Finish of deck units shall be maintained at all times by using touch-up paint whenever necessary to prevent the formation of rust.

PART 2 PRODUCTS

2.1 DECK UNITS

Deck units shall conform to SDI Pub No 30. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span 3 or more supports with flush, telescoped, or nested 2 inchlaps at ends, and interlocking, or nested side laps, unless otherwise indicated. Deck with cross-sectional configuration differing from the units indicated may be used, provided that the properties of the proposed units, determined in accordance with AISI Cold-Formed Mnl, are equal to or greater than the properties of the units indicated and that the material will fit the space provided without requiring revisions to adjacent materials or systems.

2.1.1 Roof Deck

Steel deck shall conform to ASTM A 792/A 792M, ASTM A 611 or ASTM A 792/A 792M. Roof deck units shall be fabricated of the steel design thickness required by the design drawings and shall be galvanized.

2.2 TOUCH-UP PAINT

Touch-up paint for zinc-coated units shall be an approved galvanizing repair paint with a high-zinc dust content. Welds shall be touched-up with paint conforming to SSPC Paint 20 in accordance with ASTM A 780. Finish of deck units and accessories shall be maintained by using touch-up paint whenever necessary to prevent the formation of rust.

2.3 ADJUSTING PLATES

Adjusting plates or segments of deck units shall be provided in locations too narrow to accommodate full-size units. As far as practical, the plates shall be the same thickness and configuration as the deck units.

2.4 CLOSURE PLATES

2.4.1 Closure Plates for Roof Deck

Voids above interior walls shall be closed with sheet metal where shown. Open deck cells at parapets, end walls, eaves, and openings through roofs shall be closed with sheet metal. Sheet metal shall be same thickness as deck units.

2.4.2 Cover Plates to Close Panels

Cover plates to close panel edge and end conditions and where panels change direction or abut. Butt joints in composite steel deck may receive a tape joint cover.

2.4.3 Sheet Metal

Where deck is cut for passage of pipes, ducts, columns, etc., and deck is to remain exposed, provide a neatly cut sheet metal collar to cover edges of deck. Do not cut deck until after installation of supplemental supports.

2.5 ACCESSORIES

The manufacturer's standard accessories shall be furnished as necessary to complete the deck installation. Metal accessories shall be of the same material as the deck and have minimum design thickness as follows: saddles, 0.0474 inch; welding washers, 0.0598 inch; cant strip, 0.0295 inch; other metal accessories, 0.0358 inch; unless otherwise indicated. Accessories shall include but not be limited to saddles, welding washers, cant strips, butt cover plates, underlapping sleeves, and ridge and valley plates.

PART 3 EXECUTION

3.1 ERECTION

Erection of deck and accessories shall be in accordance with SDI Pub No 29 and the approved detail drawings. Damaged deck and accessories including material which is permanently stained or contaminated, with burned holes or deformed shall not be installed. The deck units shall be placed on secure supports, properly adjusted, and aligned at right angles to supports before being permanently secured in place. The deck shall not be filled with concrete, used for storage or as a working platform until the units have been secured in position. Loads shall be distributed by appropriate means to prevent damage during construction and to the completed assembly. The maximum uniform distributed storage load shall not exceed the design live load. There shall be no loads suspended directly from the steel deck.

3.2 ATTACHMENTS

All fasteners shall be installed in accordance with the manufacturer's recommended procedure, except as otherwise specified. The deck units shall be welded with nominal 5/8 inch diameter puddle welds or fastened with screws, powder-actuated fasteners or pneumatically driven fasteners to supports as indicated on the design drawings and in accordance with requirements of SDI Pub No 29. All welding of steel deck shall be in accordance with AWS D1.3 using methods and electrodes as recommended by the manufacturer of the steel deck being used. Welds shall be made only by operators previously qualified by tests prescribed in AWS D1.3 to perform the type of work required. Welding washers shall not be used at the connections of the deck to supports. Welding washers shall not be used at sidelaps. Holes and similar defects will not be acceptable. Deck ends shall be lapped 2 inches. All partial or segments of deck units shall be attached to structural supports in accordance with Section 2.5 of SDI Diaphram Mnl. Powder-actuated fasteners shall be driven with a low-velocity piston tool by an operator authorized by the manufacturer of the piston tool. Pneumatically driven fasteners shall be driven with a low-velocity fastening tool and shall comply with the manufacturer's recommendations.

3.3 HOLES AND OPENINGS

All holes and openings required shall be coordinated with the drawings, specifications, and other trades. Holes and openings shall be drilled or cut, reinforced and framed as indicated on the drawings or described in the specifications and as required for rigidity and load capacity. Holes and openings less than 6 inches across require no reinforcement. Holes and openings 6 to 12 inches across shall be reinforced by 0.0474 inch thick steel sheet at least 12 inches wider and longer than the opening and be fastened to the steel deck at each corner of the sheet and at a maximum of 6 inches on center. Holes and openings larger than 12 inches shall be reinforced by steel angles installed perpendicular to the steel joists and supported by the adjacent steel joists. Steel angles shall be installed perpendicular to the deck ribs and shall be fastened to the angles perpendicular to the steel joists. Openings must not interfere with seismic members such as chords and drag struts.

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SECTION 05420

COLD-FORMED METAL JOIST AND TRUSSES 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING MATERIAL (ASTM)

ASTM A 653 (1994) Sheet Steel, Zinc-Coated

(Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot Dip Process.

ASTM A 780 (1993a) Repair of Damaged and Uncoated

Areas of Hot-Dip Galvanized Coatings.

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI (1990) Specifications for the Design of

Cold-Formed Steel Structural Members.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 Structural Welding Code - Steel.

AWS D1.3 Structural Welding Code - Sheet Steel.

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Submit Manufacturers' Product Data and installation instructions for each type of cold-formed steel framing and accessory required.

SD-04 Drawings

Roof Trusses; GA.

Show member, type, location, spacing size and gage of members, method of

attachment to supporting members and all necessary erection details. Indicate supplemental bracing, strapping, splices, bridging, accessories and details required for proper installation.

Submit detailed roof truss layouts.

Truss Drawings: Sealed and signed by a qualified registered Engineer, verifying truss ability to meet local code and design requirements, including:

- a. Description of design criteria.
- b. Engineering analysis depicting member stresses and truss deflection.
- c. Truss member sizes and gages and connections at truss joints.
- d. Truss support reactions.
- e. Top chord, bottom chord and web bracing requirements.

1.3 PERFORMANCE REQUIREMENTS

1.3.1 Structural Characteristics

Calculate structural characteristics of cold-formed steel truss members according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members".

1.3.2 Structural Performance

Design, engineer, fabricate, and erect cold-formed steel trusses to withstand specified design loads within limits and under conditions required.

- a. Design loads: Snow Load of 50 psf .
- b. Vertical live-load deflections for roof trusses shall be less than or equal to 1/240 of the span.
- c. Design framing systems to provide for movement of framing members without damage or over-stressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 F degrees.

1.4 QUALITY ASSURANCE

1.4.1 Qualifications

Fabricator: Shall be an experienced cold-formed steel truss fabricator with not less than 3 satisfactory experiences designing and fabricating cold-formed steel truss systems equal in material, design and extent to the systems required for this Project.

Installer: Cold-formed steel truss system installation shall be performed by an experienced installer approved by the steel truss system fabricator.

Welder: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure.

1.5 DELIVERY, STORAGE AND HANDLING

1.5.1 Protection

Protect trusses and accessories from corrosion, deformation, damage and deterioration when stored at job site. Keep trusses free of dirt and other foreign matter.

1.5.2 Delivery

Deliver materials in manufacturers' unopened containers or bundles, fully identified by name, brand, type and grade. Exercise care to avoid damage during unloading, storing and erection.

1.5.3 Storage

Store trusses on blocking, pallets, platforms or other supports off the ground and in an upright position sufficiently braced to avoid damage from excessive bending.

1.5.4 Damaged Material

Replace damaged material prior to acceptance at no additional cost to the Owner.

1.6 PROJECT CONDITIONS

1.6.1 Existing Conditions

Inspect the project prior to installation. If conditions do not meet approval, notify the Architect. Proceeding without notification implies acceptance of conditions.

1.6.2 Field Measurements

Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication. Show recorded measurements on final Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work. Where field measurements cannot be made without delaying Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.6.3 Load Distribution

During construction, adequately distribute all loads applied to trusses so as not to exceed the carrying capacity of any one joist, truss or other component.

PART 2 PRODUCTS

2.1 MANUFACTURERS

Design Standard of Quality is based on Tru-Tek, 27725 Danville Avenue, PO Box 458, Castle Rock, MN 55010, (651) 463-7009, Fax: (651) 463-2479.

2.2 COMPONENTS

System components Standard of Quality are based on MiTek Industries, Inc., ULTRA-SPAN and POSI-STRUT light-gage steel floor truss and roof truss components.

2.3 MATERIALS

2.3.1 General

Provide manufacturers' standard steel truss members, bracing, bridging, blocking, reinforcements, fasteners and accessories with each type of steel framing required, as recommended by the manufacturer for the applications indicated and as needed to provide a complete light-gage cold-formed steel truss system.

Component Gages: Fabricate components of structural quality steel sheet per ASTM A 653, with a minimum yield strength of 40,000 psi.

Bracing, bridging and blocking members: Fabricate components of commercial quality steel sheet per ASTM A 653 with a minimum yield strength of 33,000 psi.

2.3.2 Ultra-Span Steel Truss Components

Provide sizes, shapes and gages as shown on drawings and as indicated below:

- a. Design uncoated steel thickness: 20 gage, 0.0360 inch.
- b. Design uncoated steel thickness: 18 gage, 0.0470 inch.
- c. Design uncoated steel thickness: 16 gage, 0.0580 inch.
- d. Design uncoated steel thickness: 14 gage 0.0750 inch.

2.3.3 Finish

Provide components with protective zinc coating, complying with ASTM A 653, minimum G60 coating.

2.3.4 Fastenings

Manufacturer-recommended self-drilling, self-tapping screws with

corrosion-resistant plated finish. Fasteners shall be of sufficient size and number to ensure the strength of the connection.

Welding: Comply with AWS D1.1 when applicable and AWS D1.3 for welding base metals less than 1/8-inch thick.

Other fasteners as accepted by truss-design engineer

2.4 FABRICATION

Factory-fabricate cold-formed steel trusses plumb, square, true to line, and with connections securely fastened, according to manufacturers' recommendations and the requirements of the Section.

Fabricate truss assemblies in jig templates.

Fasten cold-formed steel truss members by welding or screw fastening or other methods as standard with fabricator. Wire tying of framing members is not permitted.

Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

Locate mechanical fasteners and install according to cold-framed steel truss component manufacturers' instructions with screw penetrating joined members by not less than 3 exposed screw threads.

Care shall be taken during handling, delivery and erection. Brace, block, or reinforce truss as necessary to minimize member and connection stresses.

Fabricate trusses to a maximum allowable tolerance variation from plumb, level, and true-to-line of 1/8 inch in 10 feet (1:960).

Fabricate each cold-formed steel truss to a maximum out-of-square tolerance of 1/8 inch.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Work of Other Trades

Prior to commencing work, carefully inspect and verify that work is complete to point where this installation may properly commence.

3.1.2 Verification of Conditions

Verify that trusses may be installed in accordance with original design, pertinent codes and regulations, and pertinent portions of referenced standards.

3.1.3 Discrepancies

Immediately notify the Contracting Officer's Representative. Do not proceed

with installation in areas of discrepancy until fully resolved.

3.1.4 Conditions

Examine structure, substrates and installation conditions. Do not proceed with cold-formed steel truss installation until unsatisfactory conditions have been corrected.

Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION

Erection of trusses, including proper handling, safety precautions, temporary bracing, and other safeguards or procedures are the responsibility of the Contractor and the Contractor's installer.

Exercise care and provide erection bracing required to prevent toppling or dominoeing of trusses during erection.

Follow OSHA requirements.

Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at design spacing indicated.

Provide proper lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by truss fabricator. Exercise care to avoid damage to truss members during erection and to keep horizontal bending of the trusses to a minimum.

Provide framing anchors as indicated or accepted on the design drawings or erection drawings. Anchor trusses securely at bearing points.

Install roof framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturers' recommendations.

DO NOT cut truss members without prior approval of Government.

Fasten cold-formed steel roof framing by welding or screw fastening, as standard with fabricator. Wire tying of roof framing is not permitted.

Comply with AWS requirements and procedures for welding appearance and quality of welds, and methods used in correcting welding work.

Locate mechanical fasteners and install according to cold-formed roof framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

Install roof framing in one-piece lengths, unless splice connections are indicated.

Provide temporary bracing and leave in place until trusses are permanently stabilized.

Install trusses to a maximum allowable tolerance variation from plumb, level, and true-to-line of 1/8 inch in 10 feet (1:960).

Space individual trusses no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 TRUSS INSTALLATION

Space trusses 24 inches on centers.

Do not alter, cut, or remove truss members or connections of trusses.

Erect trusses with plane of truss webs plumb and parallel to each other, align and accurately position at spacing indicated.

Effect trusses without damaging truss members or connections.

Align truss bottom chords with load-bearing studs or continuously reinforce tract to transfer loads to structure. Anchor trusses securely at all bearing points.

Install continuous bridging and permanent truss bracing per truss design requirements.

Install necessary roof cross and diagonal per design professional recommendations.

3.4 REPAIRS AND PROTECTION

Prepare and repair damaged galvanized coatings on fabricated and install cold-formed steel framing with galvanizing repair paint according to ASTM A 780 and the manufacturers' instructions.

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SECTION 05500

MISCELLANEOUS METAL 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION

AA DAF-45 (1980; R1993) Designation System for Aluminum Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3 (1992) Ladders - Fixed - Safety Requirements

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1996) Carbon Structural Steel
ASTM A 53	(1996) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 500	(1993) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 569	(1997) Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality
ASTM A 653	(1996) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924	(1996a) Steel Sheet, Metallic-Coated by the Hot-Dip Process

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (1995) Minimum Design Loads for Buildings and Other Structures

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 (1994) Structural Welding Code - Steel

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-344 (Rev. B) Lacquer, Clear Gloss, Exterior,

Interior

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MBG 531 (1993) Metal Bar Grating Manual

NAAMM MBG 532 (1988) Heavy Duty Metal Bar Grating Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Miscellaneous Metal Items; GA.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings and catalog cuts for the following items: access hatches and panels and ladder safety devices.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, ASTM A 653, or ASTM A 924, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied.

Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive

materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.5 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.6 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

1.7 ALUMINUM FINISHES

Unless otherwise specified, aluminum items shall have standard mill finish. The thickness of the coating shall be not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF-45. Items to be anodized shall receive a polished satin finish. Aluminum surfaces to be in contact with plaster or concrete during construction shall be protected with a field coat conforming to CID A-A-344.

1.8 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS

Doors and panels shall be flush type unless otherwise indicated. Frames for access doors shall be fabricated of not lighter than 16 gauge steel with welded joints and finished with anchorage for securing into construction. Access doors shall be a minimum of 14 by 20 inches and of

not lighter than 14 gauge steel, with stiffened edges, complete with attachments. Access doors shall be hinged to frame and provided with a flush face, screw driver operated latch. Exposed metal surfaces shall have a baked enamel finish.

2.2 ACCESS HATCHES AND COVERS

Hatch(s) shall be a single leaf type pre-assembled by the manufacturer. Frames for the access hatch shall be fabricated from ¼" thick aluminum channel and furnished with bend down anchor tabs for securing into poured concrete construction. The frame shall include a perimeter gasket around the cover edge surface to minimize dirt and debris from entering the channel frame. The frame shall include a drain coupling; location as approved by the Contracting Officer's Representative. Access covers shall be a minimum of 30" by 36" inches in size and ¼" thick aluminum plate with hinges mounted on the long side (opening hand approved by the Contracting Officer's Representative). Hinges shall be of forged aluminum and bolted to the cover and frame using 316 S.S. fasteners with flush heads on the cover. Hinges shall utilize 316 S.S. or other corrosion resistant material for the hinge pins. Covers shall be able to support a 300 psf (pound per square foot) load with a maximum of 1/150th of the span for deflection. Access covers shall be hinged to the frame and provided and smooth and easy controlled operation through the operating arc and such operation is unaffected by ambient temperatures. The cover shall be assisted in opening by enclosed compression spring operator springs, which also prevent uncontrolled slamming of the cover in the closing mode. A spring-operated latch shall secure the cover in the closed position and operated by a removable handle with a spring-loaded detent to hold the handle in place. The handle hole shall be sealed in non-use periods by a gasketed flush head removable screw plug. Covers shall be equipped with a safety hold open device to secure the open position at 90 degrees. Exposed metal surfaces shall have a factory finish of mill aluminum, with the frame exterior surface coated with bituminous material for concrete contact. The access hatch(s) shall be similar or equal to Bilco Model JD-AL as manufactured by Bilco Company, New Haven, Connecticut.

2.3 LADDER SAFETY DEVICES

Rails, travel sleeve, and safety belt shall be Saf-T-Lok components as manufactured by North Safety Products, Cranston, R.I. 02921, or equal.

2.4 PIPE GUARDS

Pipe guards shall be heavy duty steel pipe conforming to ASTM A 53, Type E or S, weight STD, black finish.

2.5 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, frames, and steel door frames shall be provided to complete the work. All miscellaneous plates and shapes shall be hot-dipped galvanized in accordance with Section 05055: METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.6 STEEL DOOR FRAMES (Overhead Coiling Door)

Steel door frames built from structural shapes shall be neatly mitered and securely welded at the corners with all welds ground smooth. Jambs shall be provided with 2 by 1/4 by 12 inch bent, adjustable metal anchors spaced not over 24 inches on centers. Provision shall be made to stiffen the top member for all spans over 3 feet..

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified.

3.2 REMOVABLE ACCESS PANELS

A removable access panel not less than 12 by 12 inches shall be installed directly below each valve, flow indicator, damper, or air splitter that is located above the ceiling, other than an acoustical ceiling, and that would otherwise not be accessible.

3.3 INSTALLATION OF PIPE GUARDS

Pipe guards shall be set vertically in concrete piers. Piers shall be constructed of, and the hollow cores of the pipe filled with, concrete having a compressive strength of 3000 psi..

3.4 LADDER SAFETY DEVICES

Each ladder shall be provided with a center rail bolted to the center of the ladder with mounting brackets not less than 5 feet apart that secure the rail to the ladder rungs. The rail shall be fabricated of galvanized steel pipe with notches every 6 inches to engage a pawl on the actuation sleeve that follows the pipe. The sleeve shall have a safety snap secured to the body of the sleeve in such a manner that springs and pins will engage the locking pawl should uncontrolled descent begin. Upward travel over the guide rail is unrestricted and allows free ascent. A 36" section of rail shall be fabricated to extend above the hatch cover surface in the open condition. This section shall be secured to the main ladder rail by a rod inside the 36 " section that engages a threaded insert at the end of the ladder rail. In addition the 36" section shall have the end formed to engage an enlarged bell on the top of the ladder rail. This shall provide positive locking of the rail extension into the ladder rail. A safety belt of nylon fabric webbing with necessary drop forged rings to secure to the sleeve shall be furnished in an adjustable design for the person's waist.

The Contractor shall provide a belt for each pump station and all ladders in the pump stations and gatewells shall be provided with the specified rail system over the entire length of the ladder. All ladder locations that terminate at the top level of the gatewell or pump station shall be

provided with the specified removable rail extensions. Ladders that terminate at an intermediate landing in the gatewell shall have the rail extend 36" above the grating.

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SECTION 06100

ROUGH CARPENTRY 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)

AF&PA T01 (1991; Supplement 1993; Addenda Apr 1997; Supple T02) National Design Specification

for Wood Construction

AF&PA T11 (1988) Manual for Wood Frame Construction

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4 (1995) Basic Hardboard

AHA A194.1 (1985) Cellulosic Fiber Board

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

AITC TC Manual (1994) Timber Construction Manual

AITC 109 (1990) Standard for Preservative Treatment

of Structural Glued Laminated Timber

AITC 111 (1979) Recommended Practice for Protection

of Structural Glued Laminated Timber During Transit, Storage and Erection

AITC 190.1 (1992) Wood Products - Structural Glued

Laminated Timber

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A208.1 (1999) Particleboard Mat Formed Woods

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 307 (1997) Carbon Steel Bolts and Studs, 60

000 PSI Tensile Strength

ASTM C 79/C 79M	(1997) Treated Core and Nontreated Core Gypsum Sheathing Board
ASTM C 208	(1995) Cellulosic Fiber Insulating Board
ASTM C 516	(1980; R 1996el) Vermiculite Loose Fill Thermal Insulation
ASTM C 518	(1998) Steady-State Heat Flux Measurements and Thermal Transmission Properties By Means of the Heat Flow Meter Apparatus
ASTM C 549	(1981; R 1995el) Perlite Loose Fill Insulation
ASTM C 552	(1991) Cellular Glass Thermal Insulation
ASTM C 553	(1992) Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C 578	(1995) Rigid, Cellular Polystyrene Thermal Insulation
ASTM C 591	(1994) Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C 612	(1993) Mineral Fiber Block and Board Thermal Insulation
ASTM C 665	(1998) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM C 726	(1993) Mineral Fiber Roof Insulation Board
ASTM C 739	(1997) Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation
ASTM C 764	(1998) Mineral Fiber Loose-Fill Thermal Insulation
ASTM C 1136	(1995) Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM C 1177/C 1177M	(1996) Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C 1289	(1998) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D 2898	(1999) Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing

ASTM D 3498	(1999) Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems	
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials	
ASTM E 96	(1995) Water Vapor Transmission of Materials	
ASTM E 154	(1988; R 1999) Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover	
ASTM F 547	(1977; R 1995) Definitions of Terms Relating to Nails for Use with Wood and Wood-Base Materials	
AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)		
AWPA C2	(1995) Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes	
AWPA C9	(1997) Plywood - Preservative Treatment by Pressure Processes	
AWPA C20	(1996) Structural Lumber Fire-Retardant Pressure Treatment	
AWPA C27	(1996) Plywood - Fire-Retardant Pressure Treatment	
AWPA M4	(1996) Standard for the Care of Preservative-Treated Wood Products	
AWPA P5	(1997) Standards for Waterborne Preservatives	
APA - THE ENGINEERED WOOD ASSOCIATION (APA)		
APA EWS R540C	(1996) Builder Tips Proper Storage and Handling of Glulam Beams	
APA EWS T300C	(1997) Technical Note Glulam Connection Details	
APA PRP-108	(1980; Rev Jan 1996) Performance Standards and Policies for Structural-Use Panels	
CALIFORNIA REDWOOD ASSOCIATION (CRA)		
CRA RIS-01-SS	(1997) Standard Specifications for Grades	

of California Redwood Lumber

CODE OF FEDERAL REGULATIONS (CFR)

16 CFR 1209 Interim Safety Standard for Cellulose

Insulation

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1996) Voluntary Product Standard -

Construction and Industrial Plywood

DOC PS 2 (1992) Performance Standards for

Wood-Based Structural-Use Panels

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM LPD 1-49 (1995) Loss Prevention Data Sheet -

Perimeter Flashing

NATIONAL HARDWOOD LUMBER ASSOCIATION (NHLA)

NHLA Rules (1994) Rules for the Measurement &

Inspection of Hardwood & Cypress

NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)

NELMA Grading Rules (1997) Standard Grading Rules for

Northeastern Lumber

SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION (SCMA)

SCMA Specs (1986; Supple No. 1, Aug 1993) Standard

Specifications for Grades of Southern

Cypress

SOUTHERN PINE INSPECTION BUREAU (SPIB)

SPIB Rules (1994; Supple 8 thru 11) Standard Grading

Rules for Southern Pine Lumber

TRUSS PLATE INSTITUTE (TPI)

TPI 1 (1995; Errata) National Design Standard

for Metal Plate-Connected Wood Truss

Construction and Commentary; and Apendix 1

TPI Bklet HIB (1991) Handling, Installing & Bracing

Metal Plate Connected Wood Trusses

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

WCLIB Std 17 (1996; Supples VII(A-E), VIII(A-C))

Grading Rules for West Coast Lumber

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

WWPA Grading Rules

(1999) Western Lumber Grading Rules 95

1.2 DELIVERY AND STORAGE

Materials shall be delivered to the site in undamaged condition, stored off ground in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity. Laminated timber shall be handled and stored in accordance with AITC 111 or APA EWS R540C.

PART 2 PRODUCTS

2.1 LUMBER, TIMBER, AND SHEATHING

2.1.1 Grading and Marking

2.1.1.1 Lumber Products

Solid sawn and finger-jointed lumber and timber shall bear an authorized gradestamp or grademark recognized by ALSC, or an ALSC recognized certification stamp, mark, or hammerbrand. Surfaces that are to be exposed to view shall not bear grademarks, stamps, or any type of identifying mark. Hammer marking will be permitted on timbers when all surfaces will be exposed to view.

2.1.1.2 Plywood and Other Sheathing Products

Materials shall bear the grademark or other identifying marks indicating grades of material and rules or standards under which produced, including requirements for qualifications and authority of the inspection organization. Except for plywood and wood structural panels, bundle marking will be permitted in lieu of marking each individual piece. Surfaces that are to be exposed to view shall not bear grademarks or other types of identifying marks.

2.1.2 Sizes

Lumber, timber, and material sizes shall conform to requirements of the rules or standards under which produced. Unless otherwise specified, lumber and timber shall be surfaced on four sides. Unless otherwise specified, sizes indicated are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

2.1.3 Treatment

Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M4. Items of all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil. Except as specified for all-heart material of the previously mentioned species, the following items shall be treated:

- a. Wood members in contact with or within 18 inches of soil.
- b. Wood members in contact with water.
- c. Wood members exposed to the weather including those used in builtup roofing systems or as nailing strips or nailers over fiberboard or gypsum-board wall sheathing as a base for wood siding.
- d. Wood members set into concrete regardless of location, including flush-with-deck wood nailers for roofs.
- e. Wood members in contact with concrete that is in contact with soil or water or that is exposed to weather.

2.1.3.1 Lumber and Timbers

Lumber and timbers shall be treated in accordance with AWPA C2 with waterborne preservatives listed in AWPA P5 to a retention level as follows:

- a. 0.25 pcf intended for above ground use.
- b. 0.40 pcf intended for ground contact and fresh water use.

2.1.3.2 Plywood

Plywood shall be treated in accordance with AWPA C9 with waterborne preservatives listed in AWPA P5 to a retention level as follows:

- a. 0.25 pcf intended for above ground use.
- 0.40 pcf intended for ground contact and fresh water use.

2.1.4 Moisture Content

At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows:

- a. Treated and Untreated Lumber Except Roof Planking: 4 inches or less, nominal thickness, 19 percent maximum. 5 inches or more, nominal thickness, 23 percent maximum in a 3 inch perimeter of the timber cross-section.
 - b. Roof Planking: 15 percent maximum.
- c. Materials Other Than Lumber: In accordance with standard under which product is produced.

2.1.5 Sheathing

2.1.5.1 Plywood

Plywood shall conform to DOC PS 1, APA PRP-108 or DOC PS 2, Grade C-D or sheathing grade with exterior glue. Sheathing for roof and walls without

corner bracing of framing shall have a span rating of 16/0 or greater for supports 16 inches on center and a span rating of 24/0 or greater for supports 24 inches on center.

2.1.6 Miscellaneous Wood Members

2.1.6.1 Nonstress Graded Members

Members shall include bridging, corner bracing, furring, grounds, and nailing strips. Members shall be in accordance with TABLE I for the species used. Sizes shall be as follows unless otherwise shown:

Member	Size (inch)
Bridging	1 x 3 or 1 x 4 for use between members 2 x 12 and smaller; 2 x 4 for use between members larger than 2 x 12.
Corner bracing	1 x 4.
Furring	1 x 2.
Grounds	Plaster thickness by 1-1/2.
Nailing strips	1 x 3 or 1 x 4 when used as shingle base or interior finish, otherwise 2 inch stock.

2.1.6.2 Sill Plates

Sill plates shall be standard or number 2 grade.

2.1.6.3 Blocking

Blocking shall be standard or number 2 grade.

2.1.6.4 Rough Bucks and Frames

Rough bucks and frames shall be straight standard or number 2 grade.

2.2 ACCESSORIES AND NAILS

Markings shall identify both the strength grade and the manufacturer. Accessories and nails shall conform to the following:

2.2.1 Anchor Bolts

ASTM A 307, size as indicated, complete with nuts and washers.

2.2.2 Bolts: Lag, Toggle, and Miscellaneous Bolts and Screws

Type, size, and finish best suited for intended use. Finish options include zinc compounds, cadmium, and aluminum paint impregnated finishes.

2.2.3 Clip Angles

Steel, 3/16 inch thick, size best suited for intended use; or zinc-coated steel or iron commercial clips designed for connecting wood members.

2.2.4 Expansion Shields

Type and size best suited for intended use.

2.2.5 Nails and Staples

ASTM F 547, size and type best suited for purpose; staples shall be as recommended by the manufacturer of the materials to be joined. For sheathing and subflooring, length of nails shall be sufficient to extend 1 inch into supports. In general, 8-penny or larger nails shall be used for nailing through 1 inch thick lumber and for toe nailing 2 inch thick lumber; 16-penny or larger nails shall be used for nailing through 2 inch thick lumber. Nails used with treated lumber and sheathing shall be galvanized. Nailing shall be in accordance with the recommended nailing schedule contained in AF&PA T11. Where detailed nailing requirements are not specified, nail size and spacing shall be sufficient to develop an adequate strength for the connection. The connection's strength shall be verified against the nail capacity tables in AF&PA T01. Reasonable judgement backed by experience shall ensure that the designed connection will not cause the wood to split. If a load situation exceeds a reasonable limit for nails, a specialized connector shall be used.

2.3 INSULATION

2.3.1 Sill Sealer

Mineral wool, 1 inch thick and compressible to 1/32 inch, width of sill, designed to perform as an air, dirt, and insect seal in conformance with ASTM C 665, Type I.

PART 3 EXECUTION

3.1 INSTALLATION OF FRAMING

3.1.1 General

General framing shall be in accordance with AF&PA T11.Members shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place. Members shall be framed for passage of ducts. Members shall be cut, notched, or bored in accordance with applicable requirements of AF&PA T01 for the passage of pipes, wires, or conduits. Rafters, purlins, and joists shall be set with crown edge up. Framing shall be kept at least 2 inches away from chimneys and 4 inches away from fireplace backwalls. When joists, beams, and girders are placed on masonry or concrete, a wood base plate shall be positioned and leveled with grout. The joist, beam, or girder shall then be placed on the plate. When joists, beams, and girders are set into masonry or concrete, a pocket shall be formed into the wall. The joist, beam, or girder shall then be placed into

the pocket and leveled with a steel shim.

3.1.2 Structural Members

Members shall be adequately braced before erection. Members shall be aligned and all connections completed before removal of bracing. Individually wrapped members shall be unwrapped only after adequate protection by a roof or other cover has been provided. Scratches and abrasions of factory-applied sealer shall be treated with two brush coats of the same sealer used at the factory.

3.1.3 Partition and Wall Framing

Unless otherwise shown, studs shall be spaced 16 inches on centers. Studs shall be doubled at openings. Unless otherwise indicated, headers for openings shall be made of two pieces of stud material set on edge or solid lumber of equivalent size, and corners shall be constructed of not less than three full members. End studs of partitions abutting concrete or masonry shall be anchored thereto with expansion bolts, one near each end of each stud and at intermediate intervals of not more than 4 feet. Plates of partitions resting on concrete floors shall be anchored in place with expansion bolts, one near each end of each piece and at intermediate intervals of not more than 6 feet between bolts. In lieu of expansion bolts, anchoring into concrete may be accomplished with powder-driven threaded studs of suitable type and size and spaced at 3 feet on center. Walls and load bearing partitions shall be provided with double top plates with members lapped at least 2 feet and well spiked together.

3.2 INSTALLATION OF SHEATHING

3.2.1 Plywood and Wood Structural Panels

Sheathing shall be applied with edges 1/8 inch apart at side and end joints, and nailed at supported edges at 6 inches on center and at intermediate supports 12 inches on center unless otherwise shown. Nailing of edges shall be 3/8 inchfrom the edges. Wall sheathing shall extend over top and bottom plates, and if applied horizontally the vertical joints shall be made over supports and staggered. Wall sheathing over which wood shingles are to be applied shall be applied horizontally. Roof sheathing shall be applied with long dimension at right angles to supports, end joints made over supports, and end joints staggered.

3.3 INSTALLATION OF MISCELLANEOUS WOOD MEMBERS

3.3.1 Bridging

Wood bridging shall have ends accurately bevel-cut to afford firm contact and shall be nailed at each end with two nails. Metal bridging shall be installed as recommended by the manufacturer. The lower ends of bridging shall be driven up tight and secured after subflooring or roof sheathing has been laid and partition framing installed.

3.3.2 Corner Bracing

Corner bracing shall be installed when required by type of sheathing used or when siding, other than panel siding, is applied directly to studs. Corner bracing shall be let into the exterior surfaces of the studs at an angle of approximately 45 degrees, shall extend completely over wall plates, and shall be secured at each bearing with two nails.

3.3.3 Blocking

Blocking shall be provided as necessary for application of siding, sheathing, subflooring, wallboard, and other materials or building items, and to provide firestopping. Blocking for firestopping shall ensure a maximum dimension of 8 feet for any concealed space. Blocking shall be cut to fit between framing members and rigidly nailed thereto.

3.3.4 Nailers and Nailing Strips

Nailers and nailing strips shall be provided as necessary for the attachment of finish materials. Nailers used in conjunction with roof deck installation shall be installed flush with the roof deck system. Stacked nailers shall be assembled with spikes or nails spaced not more than 18 inches on center and staggered. Beginning and ending nails shall not be more than 6 inches for nailer end. Ends of stacked nailers shall be offset approximately 12 inches in long runs and alternated at corners. Anchors shall extend through the entire thickness of the nailer. Strips shall be run in lengths as long as practicable, butt jointed, cut into wood framing members when necessary, and rigidly secured in place. Nailers and nailer installation for Factory Mutual wind uplift rated roof systems specified in other Sections of these specifications shall conform to the recommendations contained in FM LPD 1-49.

3.3.5 Wood Grounds

Wood grounds shall be provided as necessary for attachment of trim, finish, and other work to plaster. Grounds shall be run in lengths as long as practicable, butt jointed, and rigidly secured in place.

3.3.6 Rough Bucks and Frames

Rough bucks shall be set straight, true, and plumb, and secured with anchors near top and bottom of each wood member and at intermediate intervals of not more than 3 feet. Anchors for concrete shall be expansion bolts, and anchors for masonry shall be $3/16 \times 1-1/4$ inch steel straps extending not less than 8 inches into the masonry and turned down 2 inches into the masonry.

3.3.7 Sill Plates

Sill plates shall be set level and square and anchor bolted at not more than 4 feet on centers and not more than 12 inches from end of each piece. A minimum of two anchors shall be used for each piece.

3.4 INSTALLATION OF TIMBER CONNECTORS

Installation of timber connectors shall conform to applicable requirements

of AF&PA T01.

3.5 TABLES

TABLE I. SPECIES AND GRADE

Subflooring, Roof Sheathing, Wall Sheathing, Furring

Grading Rules	Species	Const Standard	No. 2 Comm	No. 2 Board Comm	No. 3 Comm
NHLA Rules					
	Cypress			X	
NELMA Grading Ru	ıles				
, J	Northern White Ceda:	r			X
	Eastern White Pine	X			
	Northern Pine	X			
	Balsam Fir				X
	Eastern Hemlock-				X
	Tamarack				
CRA RIS-01-SS					
	Redwood		X		
SCMA Specs					
	Cypress			X	
CDID Dulas					
SPIB Rules	Southern Pine		Х		
	Bodellerii Tille		21		
WCLIB Std 17					
	Douglas Fir-Larch	X			
	Hem-Fir	X			
	Sitka Spruce	X			
	Mountain Hemlock	X			
	Western Cedar	X			
WWPA Grading Rul	Ad				
WITH Grading Rai	Douglas Fir-Larch	Х			
	Hem-Fir	X			
	Idaho White Pine	X			
	Lodgepole Pine			X	
	Ponderosa Pine			X	
	Sugar Pine			X	
	Englemann Spruce			X	
	Douglas Fir South			X	
	Mountain Hemlock Subalpine Fir			X X	
	Western Cedar			X	
				21	

TABLE II. SPECIES AND GRADE

Wood Bumpers

Grading Rules	Species	No. 1	No. 2
NHLA Rules	Red Oak	X	
NELMA Grading Rules	Northern Pine Eastern Hemlock- Tamarack		x x
SPIB Rules	Southern Pine	X	
WCLIB Std 17	Douglas Fir-Larch Hem-Fir		x x
WWPA Grading Rules	Douglas Fir-Larch Hem-Fir Douglas Fir-South		X X X

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SECTION 06190

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SECTION 06190

PREFABRICATED WOOD TRUSSES 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

UNIFORM BUILDING CODE (UBC)

UBC

(1997) Uniform Building Code

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Design Calculations; GA.

Submit manufacturer's design calculations prepared and sealed by a registered professional engineer.

SD-04 Drawings

Pre-engineered, shop-assembled wood roof trusses; GA.

Shop drawings shall include layout drawing indicating location and spacing; dimensions and size of members; connection details; allowable material stresses, wind loads, live loads, and dead loads; camber and allowable deflection; bridging size and spacing; and truss connectors.

PART 2 PRODUCTS

2.1 ROOF TRUSSES

Trusses fabricated from stress-graded wood chord and web members as shown.

2.1.1 Truss Design Loads

Trusses shall support a live load of 50 psf and wind load of 20 psf. Determine and support weight of sub-roof, ceiling, and other dead loads.

Trusses shall be cambered twice dead load or as recommended by manufacturer. Deflection shall not exceed 1/240 of span.

2.2 BRIDGING

Provide wood diagonal and straight bridging as required to develop full load capabilities of trusses.

2.3 ACCESSORIES

2.3.1 Securing Trusses

Provide anchors, plates, bolts, shear devices, outriggers, and appurtenances to secure trusses to structure.

2.3.2 Truss Connectors

Provide 16 ga. galvanized truss connectors to attach trusses to top plate of wall; Simpson TC Truss Connectors, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

Install trusses and accessories in accordance with shop drawings and manufacturer's instructions.

3.1.1 General

Provide temporary bracing or false work to maintain safety and structural integrity of members until assembly is in place and final connections are made. Straighten trusses by nailing temporary spacers to top and bottom chords before application of decking. Comply with manufacturer's recommendations for bridging and connections.

-- End of Section --

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DIVISION 06 - WOODS & PLASTICS

SECTION 06200

FINISH CARPENTRY

06/02

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- 3.4 WOODWORK ITEMS
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SECTION 06200

FINISH CARPENTRY 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI A208.1 (1999) Particleboard Mat Forms Woods

ANSI Z124.3 (1995) Plastic Lavatories

ANSI Z124.6 (1995) Plastic Sinks

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F 547 (1977; R 1995) Definitions of Terms

Relating to Nails for Use with Wood and

Wood-Base Materials

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C9 (1997) Plywood - Preservative Treatment by

Pressure Processes

AWPA M4 (1996) Standard for the Care of

Preservative-Treated Wood Products

AWPA P5 (1997) Standards for Waterborne

Preservatives

CALIFORNIA REDWOOD ASSOCIATION (CRA)

CRA RIS-01-SS (1997) Standard Specifications for Grades

of California Redwood Lumber

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1996) Voluntary Product Standard -

Construction and Industrial Plywood

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

NIST PS 20 (1994; Addenda Jan. 1997) American

Softwood Lumber Standards

NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)

NELMA Grading Rules (1997) Standard Grading Rules for

Northeastern Lumber

SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION (SCMA)

SCMA Specs (1986; Supple No. 1, Aug 1993) Standard

Specifications for Grades of Southern

Cypress

SOUTHERN PINE INSPECTION BUREAU (SPIB)

SPIB Rules (1994; Supple 8 thru 11) Standard Grading

Rules for Southern Pine Lumber

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

WCLIB Std 17 (1996; Supples VII(A-E), VIII(A-C))

Grading Rules For West Coast Lumber

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

WWPA Grading Rules (1999)Western Lumber Grading Rules 95

WOOD MOULDING AND MILLWORK PRODUCERS ASSOCIATION (WMMPA)

WMMPA WM 6 (1987) Industry Standard for Non-Pressure

Treating of Wood Millwork

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Finish Carpentry; GA. Kiosk; GA. Vanities; GA.

Drawings showing fabricated items and special mill and woodwork items including, but not limited to vanities and kiosk. Drawings shall indicate materials and details of construction, methods of fastening, erection, and installation.

SD-14 Samples

Solid polymer material; GA.

Samples shall be of sufficient size to show patterns, color ranges, and

types, as applicable, of the material proposed to be used.

1.3 DELIVERY AND STORAGE

Materials shall be delivered to the site in undamaged condition, stored off ground in fully covered, well-ventilated areas, and protected from extreme changes in temperature and humidity.

PART 2 PRODUCTS

2.1 WOOD ITEMS, SIDING, AND TRIM

The Contractor shall furnish products which optimize design by reducing the amount of wood used (engineered wood), or recycled wood products, and preservatives without arsenic or chromium when the products and methods are competitive in price or directed by the Contracting Officer.

2.1.1 Grading and Marking

Materials shall bear the grademark, stamp or other identifying marks indicating grades of material and rules or standards under which produced. Such identifying marks on a material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumber shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. Except for plywood, wood structural panels, and lumber, bundle marking will be permitted in lieu of marking each individual piece. Surfaces that are to be architecturally exposed to view shall not bear grademarks, stamps, or other types of identifying marks.

2.1.2 Sizes and Patterns

Lumber sizes and patterns shall conform to rules or standards under which produced. Unless otherwise specified, lumber shall be surfaced on four sides. Sizes and patterns for materials other than lumber shall conform to requirements of the rules or standards under which produced. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

2.1.3 Moisture Content

The maximum moisture content of untreated trim and wood siding shall be 15 percent at the time of delivery to the jobsite and when installed. Moisture content of all other material shall be in accordance with the standard under which the product is produced.

2.1.4 Preservative Treatment

2.1.4.1 Plywood

Plywood shall be treated in accordance with AWPA C9 with waterborne

preservatives listed in AWPA P5 to a retention level as follows:

- a. 0.25 pcf intended for above ground use.
- b. 0.4 pcf intended for ground contact and fresh water use.

2.1.4.2 Exterior Wood Molding and Millwork

Exterior wood molding and millwork within 18 inches of soil, in contact with water or concrete shall be preservative-treated in accordance with WMMPA WM 6. Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M4. Items of all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil.

2.1.5 Interior Siding and Trim

2.1.5.1 Carsiding

Southern yellow pine, tongue and groove carsiding, edge V one or two side, C and better, smooth face, kiln-dried, dimensions as shown.

2.1.5.2 Trim (at Ceiling)

Southern yellow pine to match carsiding.

2.1.6 Exterior Siding and Trim

2.1.6.1 Siding

Western red cedar, tongue and groove lumber siding, edge V one or two side, B clear, sawn face, kiln-dried, dimensions as indicated.

2.1.6.2 Trim

Western red cedar, B clear, rough sawn.

2.1.7 Soffits

2.1.7.1 Hardboard and Plywood

Plywood soffits shall be western red cedar, 1/2 inch thick; plywood, DOC PS 1, exterior type, with all edges supported.

2.1.8 Solid Polymer Material

2.1.8.1 Cast, 100 Percent Acrylic Polymer Solid Surfacing Material

Solid polymer material shall be a homogeneous filled solid polymer; not coated, laminated or of a composite construction; meeting ANSI Z124.3 and ANSI Z124.6 requirements. Superficial damage to a depth of 0.01 inch shall be repairable by sanding or polishing. Material thickness shall be 1/2" thick, minimum.

Patterns and colors for all solid polymer components and fabrications shall be selected by the Contracting Officer from manufacturer's standard selection. Pattern and color shall occur, and shall be consistent in appearance, throughout the entire depth (thickness) of the solid polymer material. Exposed surface finish shall be matte; gloss rating of 5-20. Fabricate tops with integral backsplash and edges. Comply with solid surfacing material manufacturer's recommendations for adhesives, sealers, fabrication, and finishing.

2.1.8.2 Solid Polymer Sinks

Solid polymer sinks shall be a standard product of the solid polymer manufacturer, designed specifically to be installed in solid polymer countertops. Sinks shall be of the same polymer composition as the adjoining counter top. Sink design shall support a seam adhesive undermount installation method. Sinks shall be a single bowl configuration. Sink dimensions shall be 16 inches by 13 inches by bowl size.

2.2 NAILS

Nails shall be the size and type best suited for the purpose and shall conform to ASTM F 547. Nails shall be hot-dip galvanized or aluminum when used on exterior work. For siding, length of nails shall be sufficient to extend 1-1/2 inches into supports, including wood sheathing over framing. Screws for use where nailing is impractical shall be size best suited for purpose.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Installation of Siding

Siding shall be accurately fitted and positioned without springing or otherwise forcing siding in place. Siding to have a stain finish shall have nails set and stopped with nonstaining putty to match finished siding. Siding to have a paint finish shall have nails driven flush.

3.1.2 Vertical Lumber Siding and Carsiding

Begin application at one corner with tongue edge toward adjacent wall; trim tongue if necessary. Use a level or plumb line to ensure that first board is installed vertically. Install subsequent courses with tongue and groove edges tightly fitted together. Blind nail at maximum 16 in. on center.

1. Leave 1/8 in. gap at trim and corners, unless otherwise recommended by manufacturer, and apply sealant.

3.1.3 Ceiling Carsiding

Begin application at one corner with tongue edge toward adjacent wall; trim tongue if necessary. Install subsequent courses with tongue and groove edges tightly fitted together. Blind nail at each roof truss.

- 1. Leave 1/8 in. gap at trim and corners, unless otherwise recommended by manufacturer, and apply sealant.
- 2. Butt joints only over framing or blocking, nailing on each side of each board and staggering joints in subsequent courses.

3.2 SOFFITS

3.2.1 Wood

Panels shall be applied with edges at joints spaced in accordance with manufacturer's instructions and with all edges backed with framing members. Panels shall be nailed 3/8 inch from edges at 6 inches on center and at intermediate supports at 12 incheson center. Panels shall be installed using the maximum practical lengths.

3.3 INSTALLATION - WOOD TRIM

- 1. Install trim in single, unjointed lengths for openings and runs less than 10° . For longer runs, use only one piece less than 10° in any straight run. Stagger joints in adjacent members. Cope at returns and miter corners.
- 2. Attach trim securely with uniform joints providing for building movements. Secure woodwork to anchors or blocking built-in or directly attached to substrates.
- 3. Blind nail where possible. Use fine finishing nails where exposed. Set exposed nail heads for filling, except for exterior wood which receives natural finish (if any).
- 4. Clean woodwork and fill nail holes in preparation for finishes specified under Section 09900: PAINTING, GENERAL.

3.3.1 Fascias and Exterior Trim

Exposed surfaces and square edges shall be machine sanded, caulked, and constructed to exclude water. Joints of built-up items, in addition to nailing, shall be glued as necessary for weather-resistant construction. End joints in built-up members shall be well distributed. Joints in flat work shall be shouldered. Backs of wide-faced miters shall be held together with metal rings and glue. Fascias and other flat members shall be in maximum practicable lengths. Cornices shall be braced, blocked and rigidly anchored for support and protection of vertical joints.

3.3.2 Moldings and Interior Trim

Molding and interior trim shall be installed straight, plumb, level and with closely fitted joints. Exposed surfaces shall be machine sanded at the mill. Molded work shall be coped at returns and interior angles and mitered at external corners. Intersections of flatwork shall be shouldered to ease any inherent changes in plane. Window and door trim shall be provided in single lengths. Blind nailing shall be used to the extent

practicable, and face nailing shall be set and stopped with a nonstaining putty to match the finish applied. Screws shall be used for attachment to metal; setting and stopping of screws shall be of the same quality as required where nails are used.

3.4 WOODWORK ITEMS

3.4.1 Installation - General

Items shall be installed in accordance with the manufacturer's recommendation.

- 1. Condition woodwork to average prevailing humidity prior to installation.
- 2. Install carpentry and woodwork plumb, level, true, and straight with no distortions. Shim as required using concealed shims. Where woodwork abuts other finished work, scribe and cut for accurate fit. Before making cutouts, drill pilot holes at corners.

3.5 TABLES

TABLE I. SPECIES AND GRADE TABLES

Grading Rules	Species	Choice	Clear	C Select	C & Better
NELMA Grading R	ules				
_	Eastern Cedar				X
	Eastern Hemlock		X		
	Tamarack				X
	Eastern W. Pine				X
	Northern Pine				X
	Eastern Spruce			X	
	Balsam Fir		X		
CRA RIS-01-SS	Redwood		X		
SCMA Specs	Cypress			X	
SPIB Rules	Southern Pine				X
WCLIB Std 17	Douglas Fir				X
	Larch				X
	Hemlock Fir				X
	Mountain Hemlock				X
	Sitka Spruce				X
WWPA Grading Ru					
	Douglas Fir				X
	Larch				X
	Hemlock Fir		X		
	Mountain Hemlock				X
	Western Larch		X		
	Idaho White Pine	X			
	Lodgepole Pine		X		
	Ponderosa Pine		X		
	Sugar Pine		X		
	Englemann Spruce		X		
	Douglas Fir South		X		
	Subalpine Fir		X		

NOTE 1: Western Cedar under WCLIB Std 17 shall be Grade B; and under WWPA Grading Rules, Western Cedar shall be Grade B bevel for siding and Grade A for trim.

NOTE 2: Except as specified in NOTE 3 below, siding and exterior trim shall be any of the species listed above. Interior trim shall be any one of the species listed above and the highest grade of the species for stain or natural finish and one grade below highest grade of species for paint finish.

NOTE 3: Southern Yellow Pine, Douglas Fir, Larch, Western Larch, and Tamarack shall not be used where painting is required and may be used on exterior work only when approved and stained with a preservative type stain.

-- End of Section --

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DIVISION 07 - THERMAL & MOISTURE PROTECTION

SECTION 07210

BUILDING INSULATION

06/02

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- 2.3 NAIL-BASE, RIGID-BOARD INSULATION
 - 2.3.1 General Requirements
 - 2.3.2 Thickness
 - 2.3.3 Adhesive Type
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- 3.2 VAPOR BARRIER INSTALLATION
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- 3.4 MISCELLANEOUS INSULATION
- -- End of Section Table of Contents --

SECTION 07210

BUILDING INSULATION 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 578

(1995) Rigid, Cellular Polystyrene Thermal Insulation

1.2 REGULATORY REQUIREMENTS

Comply with fire-resistance and flammability ratings indicated on drawings and as required by State Code. Comply with code interpretations by governing authorities.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Insulation Product Data; GA.

Submit manufacturer's product data for each type of insulation. Include data substantiating compliance with specified requirements.

1.4 DELIVERY, STORAGE AND HANDLING

Do not allow insulation materials to become wet or soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection.

PART 2 PRODUCTS

2.1 EXTRUDED POLYSTYRENE BOARD INSULATION

Extruded closed-cell polystyrene with integral high-density skin complying

with ASTM C 578, Type X, minimum 15 psi compressive strength, thermal resistance (R-value at 40 deg F) of 5.4 per 1 in. thickness.

2.2 FIBERGLASS BATT INSULATION

Glass fiber blankets with integral kraft paper vapor barrier or separate vapor barrier as specified below, complying with ASTM C665, type I unfaced or type II faced; thermal performance of R-13 per 3-1/2 in. thickness. Unfaced blanket shall be non-combustible as determined by ASTM E136.

2.3 NAIL-BASE, RIGID-BOARD INSULATION

2.3.1 General Requirements

Composite panel consisting of a felt skin integrally bonded to polyisocyanurate foam bonded to one or two layers of APA performance rated 7/16 inch waferboard or OSB board and a fiber reinforced facer.

2.3.2 Thickness

4.5 inch nominal thickness with an R-value of 27.1.

2.3.3 Adhesive Type

Recommended by insulation manufacturer for application.

2.3.4 Tape

Bright aluminum self-adhering type, 2-inch wide.

2.3.5 Other Materials

Materials not specifically described but required for complete, proper installation of nail base rigid board insulation, subject to acceptance of Contracting Officer

2.4 VAPOR BARRIER

6 mil sheet polyethylene, clear, for exterior wall and roof surfaces; vapor barrier may be integral with batt insulation (above).

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Thickness

Extend insulation full thickness as shown over entire surface. Cut and fit tightly around obstructions, and fill voids with insulation and mastic.

3.1.2 Manufacturer's Recommendations

Comply with manufacturer's recommendations for particular conditions of installation. If printed instructions are not available or do not apply to

project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

3.1.3 Insulation Layers

Apply a single layer of insulation of required thickness, unless otherwise shown or as required to make up total thickness.

3.1.4 Insulation Below Grade

Use extruded polystyrene Type IV, minimum 25 psi compressive strength, where insulation is below grade or in contact with soil.

3.1.5 Mastics

Mastics used with polystyrene insulation shall be approved for use by insulation manufacturer.

3.2 VAPOR BARRIER INSTALLATION

Install polyethylene vapor barrier on warm side of exterior wall and ceiling insulation. Vapor barrier shall be continuous and complete. Tape all projections thru barrier to form a seal. Lap all joints 6 inches. Tape joints and edges at ceiling and at floor.

3.3 NAIL BASE RIGID BOARD INSULATION

Apply adhesive to the insulation board as recommended by the insulation and adhesive manufacturers. Adhere boards to metal deck. Nail base rigid board insulation to metal deck. Place boards in a method to maximize contact bedding by staggering end joints. Butt edges and ends tight to adjacent board and to protrusions. Tape all joints.

3.4 MISCELLANEOUS INSULATION

Insulate miscellaneous voids and cavity spaces as designated. Apply vapor barrier where necessary to prevent infiltration of outside air.

-- End of Section --

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DIVISION 07 - THERMAL & MOISTURE PROTECTION

SECTION 07412

NON-STRUCTURAL METAL ROOFING

06/02

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PART 2 PRODUCTS

- 2.1 ROOF PANELS
 - 2.1.1 Pump Station K14
 - 2.1.2 Restroom Type 1, Restroom Type 2
- 2.2 ACCESSORIES
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SECTION 07412

NON-STRUCTURAL METAL ROOFING 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 463/A 463M	(1999a) Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 653/A 653M	(1999) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 792/A 792M	(1999) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(1995) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM C 518	(1998) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 612	(1993) Mineral Fiber Block and Board Thermal Insulation
ASTM C 991	(1998) Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings
ASTM C 1177/C 1177M	(1996) Glass Mat Gypsum Substrate for Use as Sheathing
ASTM C 1289	(1998) Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
ASTM D 226	(1997a) Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

ASTM D 522	(1993a) Mandrel Bend Test of Attached Organic Coatings
ASTM D 523	(1999) Specular Gloss
ASTM D 610	(1995) Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D 714	(1987; R 1994el) Evaluating Degree of Blistering of Paints
ASTM D 968	(1993) Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 1308	(1987; R 1998) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D 1654	(1992) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D 2244	(1995) Calculation of Color Differences from Instrumentally Measured Color Coordinates
ASTM D 2247	(1997) Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D 2794	(1993) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(1997) Measuring Adhesion by Tape Test
ASTM D 4214	(1998) Evaluating Degree of Chalking of Exterior Paint Films
ASTM D 4397	(1996) Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM D 4587	(1991) Conducting Tests on Paint and Related Coatings and Materials Using a Fluorescent UV-Condensation Light- and Water- Exposure Apparatus
ASTM D 5894	(1996) Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials

ASTM E 96 (1995) Water Vapor Transmission of Materials

UNDERWRITERS LABORATORIES (UL)

UL 580 (1994; Rev thru Feb 1998) Tests for Uplift
Resistance of Roof Assemblies

1.2 GENERAL REQUIREMENTS

The Contractor shall furnish a commercially available roofing system which satisfies the specified design and additional requirements contained herein. The roofing system shall be provided by the Contractor as a complete system, as tested and approved in accordance with UL 580. Roof panels, components, transitions, accessories, and assemblies shall be supplied by the same roofing system manufacturer.

1.2.1 Non-Structural Metal Roof System

The Non-Structural Metal Roof System covered under this specification shall include the entire roofing system; the metal roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with UL 580. The system shall be installed on a substrate specified in Section 07210: BUILDING INSULATION. In addition, the system shall consist of panel finishes, slip sheet, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, skylights, eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system; and items specified in other sections of the specifications that are part of the system.

1.2.2 Manufacturer

The non-structural metal roofing system shall be the product of a manufacturer who has been in the practice of manufacturing metal roofs for a period of not less than 3 years and has been involved in at least five projects similar in size and complexity to this project.

1.2.3 Installer

The installer shall be certified by the metal roof manufacturer to have experience in installing at least three projects that are of comparable size, scope and complexity as this project for the particular roof system furnished. The installer may be either employed by the manufacturer or be an independent installer.

1.3 DESIGN LOADS

Non-structural Metal Roof System assemblies shall be tested as defined in UL 580 and shall be capable of resisting the wind uplift pressures shown on the contract drawings or, as a minimum, shall be approved to resist wind uplift pressures of UL 580, Class 90.

1.4 PERFORMANCE REQUIREMENTS

The metal roofing system supplied shall conform to the roof slope, the underlayment, and uplift pressures shown on the contract drawings. The Contractor shall furnish a commercially available roofing system which satisfies all the specified requirements.

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Metal Roofing; GA.

Drawings consisting of catalog cuts, flashing details, erection drawings, shop coating and finishing specifications, and other data as necessary to clearly describe materials, sizes, layouts, construction details, fasteners, and erection. Drawings shall be provided by the metal roofing manufacturer.

Warranties; GA.

At the completion of the project, signed copies of the 5-year Warranty for Non-Structural Metal Roofing System, a sample copy of which is attached to this section, and the 20-year Manufacturer's Material Warranties.

1.6 DELIVERY AND STORAGE

Materials shall be delivered to the site in a dry and undamaged condition and stored out of contact with the ground. Materials shall be covered with weather tight coverings and kept dry. Material shall not be covered with plastic where such covering will allow sweating and condensation. Plastic may be used as tenting with air circulation allowed. Storage conditions shall provide good air circulation and protection from surface staining.

1.7 WARRANTIES

The Non-Structural Metal Roofing System shall be warranted as outlined below. Any emergency temporary repairs conducted by the owner shall not negate the warranties.

1.7.1 Contractor's Weathertightness Warranty

The Non-Structural Metal Roofing System shall be warranted by the Contractor on a no penal sum basis for a period of five years against material and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The roofing covered under this warranty shall include the entire roofing system, including but

not limited to, the roof panels, fasteners, connectors, roof securement components, and assemblies tested and approved in accordance with UL 580. In addition, the system shall consist of panel finishes, slip sheet, insulation, vapor retarder, all accessories, components, and trim and all connections with roof panels. This includes roof penetration items such as vents, curbs, skylights; interior or exterior gutters and downspouts; eaves, ridge, hip, valley, rake, gable, wall, or other roof system flashings installed and any other components specified within this contract to provide a weathertight roof system; and items specified in other sections of the specifications that are part of the roof system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to service design loads, water leaks and wind uplift damage shall be repaired as approved by the Contracting Officer. See the attached Contractor's required warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and system manufacturer, which shall be submitted along with Contractor's warranty; however, the Contractor shall be ultimately responsible for this warranty. The Contractor's written warranty shall be as outlined in attached WARRANTY FOR NON-STRUCTURAL METAL ROOF SYSTEM, and shall start upon final acceptance of the facility. It is required that the Contractor provide a separate bond in an amount equal to the installed total roofing system cost in favor of the owner (Government) covering the Contractor's warranty responsibilities effective throughout the 5 year Contractor's warranty period for the entire roofing system as outlined above.

1.7.2 Manufacturer's Material Warranties

The Contractor shall furnish, in writing, the following manufacturer's material warranties which cover all Non-Structural Metal Roofing System components such as roof panels, flashing, accessories, and trim, fabricated from coil material:

- a. A manufacturer's 20 year material warranty warranting that the zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel as specified herein will not rupture, fail structurally, or perforate under normal atmospheric conditions at the site. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed coil material.
- b. A manufacturer's 20 year exterior material finish warranty warranting that the factory color finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of 8 when measured in accordance with ASTM D 4214; or fade or change colors in excess of 5 NBS units as measured in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to refinishing or replacing the defective coated coil material.

PART 2 PRODUCTS

2.1 ROOF PANELS

Panels shall be steel and shall have a factory color finish. Length of sheets shall be sufficient to cover the entire length of any unbroken roof slope for slope lengths that do not exceed 30 feet. Sheets longer than 30 feet may be furnished if approved by the Contracting Officer. Panels shall be zinc-coated steel conforming to ASTM A 653/A 653M. Design provisions shall be made for thermal expansion and contraction consistent with the type of system to be used. All sheets shall be either square-cut or miter-cut. The ridge cap shall be installed as recommended by the metal roofing manufacturer. Height of corrugations, ribs, or seams, at overlap of adjacent roof sheets shall be the building manufacturer's standard for the indicated roof slope.

Products identified in this section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality , type, and function. Products of other manufacturers may be submitted for those listed. Provided the substitution is equal in quality, type, and function and meets the specified requirements.

Panels shall conform to the requirements below.

2.1.1 Pump Station K14

Bermuda roofing system, 24 gauge steel traditional design with 9 1/2 inch vertical exposure laid in horizontal layers, concealed clip fastener; UNA-clad UC-700, by Copper Sales, Inc.

2.1.2 Restroom Type 1, Restroom Type 2

Snap-on standing seam roofing, 24-gauge steel, 12-inch wide panel with 1 1/2-inch pan leg (1 3/4-inch high standing seam), concealed fasteners and hold-down cups; UNA-clad UC-1, by Copper Sales, Inc.

2.2 ACCESSORIES

Accessories shall be compatible with the roofing furnished. Flashing, trim, metal closure strips, caps, and similar metal accessories shall be not less than the minimum thicknesses specified for roof panels. Exposed metal accessories shall be finished to match the panels furnished. Molded closure strips shall be bituminous-saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match configuration of the panels and shall not absorb or retain water. Ridge vent, where noted on drawings, shall be Cor-A-Vent V-600 with low profile cap, cap color and flashing match roof panels, or equal, as manufactured by Cor-A-Vent, Inc., Mishawaka, IN 46546, (800) 837-8368, Fax (800) 645-6162.

2.3 FASTENERS

Fasteners for roof panels shall be zinc-coated steel, aluminum, or nylon capped steel, type and size as recommended by the manufacturer to meet the performance requirements. Fasteners for accessories shall be the manufacturer's standard. Exposed roof fasteners shall be gasketed or have gasketed washers on the exterior side of the roofing to waterproof the

fastener penetration. Washer material shall be compatible with the panels; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch thick.

2.4 FACTORY COLOR FINISH

Panels shall have a factory applied polyvinylidene fluoride finish on the exposed side. The exterior finish shall consist of a baked-on topcoat with an appropriate prime coat. Colors shall be selected by the Contracting Officer from manufacturer's standard colors. The exterior coating shall be a nominal 1 mil thickness consisting of a topcoat of not less than 0.7 mil dry film thickness and the paint manufacturer's recommended primer of not less than 0.2 mil thickness. The exterior color finish shall meet the test requirements specified below.

2.4.1 Cyclic Salt Fog/UV Test

A sample of the sheets shall withstand a cyclic corrosion test for a minimum of 2016 hours in accordance with ASTM D 5894, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of not less than 10, no blistering, as determined by ASTM D 714; 10, no rusting, as determined by ASTM D 610; and a rating of 6, over 1/16 to 1/8 inch failure at scribe, as determined by ASTM D 1654.

2.4.2 Formability Test

When subjected to testing in accordance with ASTM D 522 Method B, 1/8 inch diameter mandrel, the coating film shall show no evidence of fracturing to the naked eye.

2.4.3 Accelerated Weathering, Chalking Resistance and Color Change

A sample of the sheets shall be tested in accordance with ASTM D 4587. The coating shall withstand the weathering test without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating that can be readily removed from the base metal with tape in accordance with ASTM D 3359, Test Method B, shall be considered as an area indicating loss of adhesion. Following the accelerated weathering test, the coating shall have a chalk rating not less than No. 8 in accordance with ASTM D 4214 test procedures, and the color change shall not exceed 5 CIE or Hunter Lab color difference (delta E) units in accordance with ASTM D 2244.

2.4.4 Humidity Test

When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, a scored panel shall show no signs of blistering, cracking, creepage or corrosion.

2.4.5 Impact Resistance

Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 0.500 inch diameter hemispherical head

indenter, equal to 1.5 times the metal thickness in mils, expressed in inch-pounds, with no cracking.

2.4.6 Abrasion Resistance Test

When subjected to the falling sand test in accordance with ASTM D 968, Method A, the coating system shall withstand a minimum of 50 liters of sand before the appearance of the base metal. The term "appearance of base metal" refers to the metallic coating on steel or the aluminum base metal.

2.4.7 Pollution Resistance

Coating shall show no visual effects when covered spot tested in a 10 percent hydrochloric acid solution for 24 hours in accordance with ASTM D 1308.

2.5 UNDERLAYMENTS

2.5.1 Felt Underlayment

Felt underlayment shall be No. 30 felt in accordance with ASTM D 226, Type II, or as indicated on the drawings.

2.5.2 Rubberized Underlayment

Rubberized underlayment shall be equal to "Ice and Water Shield" as manufactured by Grace Construction Products, "Winterguard" as manufactured by CertainTeed Corporation, or "Weather Watch Ice and Water Barrier" as manufactured by GAF Building Materials Corporation.

2.5.3 Slip Sheet

Slip Sheet shall be 5 pounds per 100 sf rosin sized unsaturated building paper.

2.6 SEALANT

Sealant shall be an elastomeric type containing no oil or asphalt. Exposed sealant shall be colored to match the applicable building color and shall cure to a rubberlike consistency. Sealant placed in the roof panel standing seam ribs shall be provided in accordance with the manufacturer's recommendations.

2.7 GASKETS AND INSULATING COMPOUNDS

Gaskets and insulating compounds shall be nonabsorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be nonrunning after drying.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with the manufacturer's erection

instructions and drawings. Dissimilar materials which are not compatible when contacting each other shall be insulated by means of gaskets or insulating compounds. Improper or mislocated drill holes shall be plugged with an oversize color-marhed screw fastener and gasketed washer; however, sheets with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces and edges shall be kept clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Stained, discolored, or damaged sheets shall be removed from the site.

3.1.1 Roofing

Side laps shall be laid away from the prevailing winds. Side and end lap distances, joint sealing, and fastening and spacing of fasteners shall be in accordance with manufacturer's standard practice. Spacing of exposed fasteners shall present an orderly appearance. Side laps and end laps of roof panels and joints at accessories shall be sealed. Fasteners shall be driven normal to the surface. Method of applying joint sealant shall conform to the manufacturer's recommendation to achieve a complete weathertight installation. Accessories shall be fastened into substrate, except as otherwise approved. Closure strips shall be provided as indicated and where necessary to provide weathertight construction.

3.1.2 Field Forming of Roof Panels for Unique Areas

When roofing panels are formed from factory-color-finished steel coils at the project site, the same care and quality control measures that are taken in shop forming of roofing panels shall be observed. Rollformer shall be operated by the metal roofing manufacturer's approved installer. In cold weather conditions, preheating of the steel coils to be field formed shall be performed as necessary just prior to the rolling operations.

3.1.3 Underlayment

Underlayment types shall be installed where shown on the drawings; they shall be installed directly over the substrate. If a roof panel rests directly on the underlayments, a slip sheet shall be installed as a top layer, beneath the metal roofing panels, to prevent adhesion. All underlayments shall be installed so that successive strips overlap the next lower strip in shingle fashion. Underlayments shall be installed in accordance with the manufacturer's written instructions. The underlayments shall ensure that any water that penetrates below the metal roofing panels will drain outside of the building envelope.

3.2 WARRANTY FORMS

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR NON-STRUCTURAL METAL ROOF SYSTEM

FACILITY DESCRIPTION
BUILDING NUMBER:
CORPS OF ENGINEERS CONTRACT NUMBER:
CONTRACTOR
CONTRACTOR:
ADDRESS:
POINT OF CONTACT:
TELEPHONE NUMBER:
OWNER
OWNER:
ADDRESS:
POINT OF CONTACT:
TELEPHONE NUMBER:
CONSTRUCTION AGENT
CONSTRUCTION AGENT
CONSTRUCTION AGENT:
ADDRESS:
POINT OF CONTACT:
TELEPHONE NUMBER:

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR NON-STRUCTURAL METAL ROOF SYSTEM (continued)

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR NON-STRUCTURAL METAL ROOFING SYSTEM (continued)

THE CONTRACTOR SHALL SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM THE MANUFACTURER AND/OR INSTALLER OF THE NON-STRUCTURAL METAL ROOFING SYSTEM, WHICH SHALL BE SUBMITTED ALONG WITH THE CONTRACTOR'S WARRANTY. HOWEVER, THE CONTRACTOR WILL BE ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

- 1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).
- 2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL, INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY FALLING OBJECTS.
- 3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE, OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE BUILDING.
- 4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS, FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE LIKE.
- 5. FAILURE OF ANY PART OF THE NON-STRUCTURAL METAL ROOF DUE TO ACTIONS BY THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE.

 CONTRACTOR'S DESIGN SHALL INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW PONDING WATER.
- 6. THIS WARRANTY APPLIES TO THE NON-STRUCTURAL METAL ROOFING SYSTEM. IT DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN THIS CONTRACT.
- 7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.

* *

CONTRACTOR'S FIVE (5) YEAR NO PENAL SUM WARRANTY FOR NON-STRUCTURAL METAL ROOF SYSTEM (continued)

**REPORTS OF LEAKS AND ROOF SYSTEM DEFICIENCIES SHALL BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS SHALL BE INITIATED IMMEDIATELY; A WRITTEN PLAN SHALL BE SUBMITTED FOR APPROVAL TO REPAIR OR REPLACE THIS ROOF SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT SHALL BE STARTED WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE NON-STRUCTURAL METAL ROOF SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.

IN THE EVENT THE CONTRACTOR DISPUTES THE EXISTENCE OF A WARRANTABLE DEFECT, THE CONTRACTOR MAY CHALLENGE THE OWNER'S DEMAND FOR REPAIRS AND/OR REPLACEMENT DIRECTED BY THE OWNER OR CONTRACTING OFFICER EITHER BY REQUESTING A CONTRACTING OFFICER'S DECISION UNDER THE CONTRACT DISPUTES ACT, OR BY REQUESTING THAT AN ARBITRATOR RESOLVE THE ISSUE. THE REQUEST FOR AN ARBITRATOR MUST BE MADE WITHIN 48 HOURS OF BEING NOTIFIED OF THE DISPUTED DEFECTS. UPON BEING INVOKED, THE PARTIES SHALL, WITHIN TEN (10) DAYS, JOINTLY REQUEST A LIST OF FIVE (5) ARBITRATORS FROM THE FEDERAL MEDIATION AND CONCILIATION SERVICE. THE PARTIES SHALL CONFER WITHIN TEN (10) DAYS AFTER RECEIPT OF THE LIST TO SEEK AGREEMENT ON AN ARBITRATOR. IF THE PARTIES CANNOT AGREE ON AN ARBITRATOR, THE CONTRACTING OFFICER AND THE PRESIDENT OF THE CONTRACTOR'S COMPANY WILL STRIKE ONE (1) NAME FROM THE LIST ALTERNATIVELY UNTIL ONE (1) NAME REMAINS. THE REMAINING PERSON SHALL BE THE DULY SELECTED ARBITRATOR. THE COSTS OF THE ARBITRATION, INCLUDING THE ARBITRATOR'S FEE AND EXPENSES, COURT REPORTER, COURTROOM OR SITE SELECTED, ETC., SHALL BE BORNE EQUALLY BETWEEN THE PARTIES. EITHER PARTY DESIRING A COPY OF THE TRANSCRIPT SHALL PAY FOR THE TRANSCRIPT. A HEARING WILL BE HELD AS SOON AS THE PARTIES CAN MUTUALLY AGREE. A WRITTEN ARBITRATOR'S DECISION WILL BE REQUESTED NOT LATER THAN 30 DAYS FOLLOWING THE HEARING. THE DECISION OF THE ARBITRATOR WILL NOT BE BINDING; HOWEVER, IT WILL BE ADMISSIBLE IN ANY SUBSEQUENT APPEAL UNDER THE CONTRACT DISPUTES ACT.

A FRAMED COPY OF THIS WARRANTY SHALL BE POSTED IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --

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SECTION 07466

METAL SOFFIT AND FASCIA

06/02

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SECTION 07466

METAL SOFFIT AND FASCIA 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 209 (1996) Aluminum and Aluminum-Alloy Sheet and Plate.

ASTM E 84 (1998) Surface Burning Characteristics of Building Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Manufacturer's Product Data; GA.

Submit manufacturer's current product data including specifications, handling, storage and installation instructions, and maintenance and cleaning recommendations.

SD-04 Drawings

Soffit and Fascia Drawings; GA

Drawings of the soffit and fascia shall include, dimensions, relation of soffit and fascia to other materials, fasteners and anchorage.

SD-14 Samples

Product Samples; GA

Samples of soffit, fascia, and accessories shall be provided prior to delivery of products to the project site.

1.3 QUALITY ASSURANCE

1.3.1 Qualifications

1.3.1.1 General

Provide metal soffit and facia systems units made of components of standard construction furnished by one manufacturer as coordinated assemblies.

1.3.1.2 Manufacturer

Five years experience in the manufacture of metal soffit and facia systems, with 6 projects of similar size, scope and type of which 3 have been in successful use for 3 years or longer.

1.3.1.3 Contractor

Three years experience in the installation of metal soffit and facia systems.

1.3.1.4 Personnel

For actual installation of metal soffit and facia systems, use personnel skilled in work required, completely familiar with manufacturer's recommended methods of installation, thoroughly familiar with requirements of work.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Protection

Protect metal soffit and facia systems from damage during shipment, storage and construction.

1.4.2 Delivery

Deliver materials to the job site in factory sealed containers bearing the manufacturer's name and brand.

1.4.3 Damaged Material

Replace damage material prior to acceptance at no additional cost to the Owner.

1.5 PROJECT CONDITIONS

1.5.1 Existing Conditions:

1.5.1.1 Field Dimensions

Drawings do not purport to show actual dimensions, but are intended only to establish location and scope of work. Field verify dimensions and assume full responsibility for their accuracy.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Sheet Stock

ASTM B 209; 3005-H19 grade aluminum sheet.

2.1.2 Accessories

2.1.2.1 Sealants and Gaskets

Manufacturer's standard type suitable for use with installation of metal facia and soffit; non-shrinking and non-sagging for exterior applications.

2.1.2.2 Contact Cement

Waterproof, all-weather type, cured resilient without final set.

2.1.2.3 Touch-up Paint

As recommended by manufacturer.

2.1.2.4 Fasteners

Manufacturer's standard type to suit application.

2.1.2.5 Other Materials.

Other materials not specifically described but required for complete, proper installation of metal soffit and facia systems, subject to acceptance of Architect

2.2 FABRICATION

2.2.1 Soffit Panels

Minimum 0.019 inch sheet stock; 12 inch wide panels vented with elongated slits or small perforation.

2.2.2 Facias, Trim, Closure Pieces, Caps, In Fills

Same material, thickness, and finish (where exposed) as sheet stock; use manufacturer's standard premanufactured profiles where possible.

2.2.3 Anchorage and Support Members

Minimum 0.014 inch gage thick aluminum girts.

2.3 FINISH

2.3.1 Exposed Surfaces of Soffit and Facia System

Two-coat acrylic type finish of color selected by the Contracting Officer

from the manufacturer's standard colors.

2.3.2 Sealants and Gaskets

Color to match metal Facia and Soffit.

2.3.3 Fasteners

Finish to match metal facia and soffit.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Work of Other Trades

Prior to commencing work, carefully inspect and verify that work is complete to point where this installation may properly commence.

3.1.2 Verification of Conditions

Verify that metal soffit and facia systems may be installed in accordance with original design, pertinent codes and regulations, and pertinent portions of referenced standards.

3.1.3 Discrepancies

Immediately notify Architect in writing. Do not proceed with installation in areas of discrepancy until fully resolved. Commencement of installation signifies acceptance of surface conditions.

3.2 PREPARATION

3.2.1 Protection

Protect installed work and materials of other trades.

3.2.2 Surface Preparation

Protect facia and soffit surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

3.3 INSTALLATION

Install metal facia, soffit, and related components in accordance with manufacturer's instructions.

Remove site cuttings from finish surfaces.

Permanently fasten facia and soffit system to structure; align, level, and plumb within specified tolerances.

3.4 CONSTRUCTION

3.4.1 Site Tolerances

Maximum offset from true alignment between adjacent members butting or in-line: 1/8 inch.

Maximum variation from plane or location indicated on Drawings: 1/4 inch.

3.5 REPAIR/RESTORATION

Touch up marred finishes, but replace units that cannot be restored to factory-finished appearance. Use materials, procedures recommended or furnished by manufacturer.

3.6 ADJUSTING

Replace damaged materials with new materials complying with specified requirements.

3.7 CLEANING

3.7.1 Site

Do not allow accumulation of scraps, debris arising from work of this section. Maintain premises in neat, orderly condition.

3.7.2 System:

Remove temporary covering and other provisions made to minimize soiling of other work.

Promptly clean surfaces not to receive metal soffit and facia systems; repair surfaces stained, marred or otherwise damaged during work.

Clean exposed surfaces of metal soffit and facia systems using materials and methods recommended by manufacturer.

When work is completed, remove unused materials, containers, equipment, and debris.

3.8 PROTECTION

Provide final protection and maintain conditions, in a manner acceptable to manufacturer to ensure work is without damage or deterioration at time of Substantial Completion.

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SECTION 07900

JOINT SEALING 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 509	(1994) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C 570	(1995) Oil- and Resin-Base Caulking Compound for Building Construction
ASTM C 734	(1993) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C 834	(1995) Latex Sealants
ASTM C 920	(1995) Elastomeric Joint Sealants
ASTM C 1085	(1991) Butyl Rubber-Based Solvent-Release Sealants
ASTM C 1184	(1995) Structural Silicone-Sealants
ASTM D 217	(1994) Cone Penetration of Lubricating Grease (IP50/88)
ASTM D 1056	(1991) Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 1565	(1981; R 1990) Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam)
ASTM E 84	(1996a) Surface Burning Characteristics of Building Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The

following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Sealant; GA.

Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). A copy of the Material Safety Data Sheet shall be provided for each solvent, primer or sealant material.

1.3 ENVIRONMENTAL REQUIREMENTS

The ambient temperature shall be within the limits of 40 to 90 degrees F when the sealants are applied.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the job in the manufacturer's original unopened containers. The container label or accompanying data sheet shall include the following information as applicable: manufacturer, name of material, formula or specification number, lot number, color, date of manufacture, mixing instructions, shelf life, and curing time at the standard conditions for laboratory tests. Materials shall be handled and stored to prevent inclusion of foreign materials. Materials shall be stored at temperatures between40 and 90 degrees F unless otherwise specified by the manufacturer.

PART 2 PRODUCTS

2.1 BACKING

Backing shall be 25 to 33 percent oversize for closed cell and 40 to 50 percent oversize for open cell material, unless otherwise indicated.

2.1.1 Rubber

Cellular rubber sponge backing shall be ASTM D 1056, Type 2, closed cell, Class A, round cross section.

2.1.2 Synthetic Rubber

Synthetic rubber backing shall be ASTM C 509, Option I, Type I preformed rods or tubes.

2.1.3 Neoprene

Neoprene backing shall be ASTM D 1056, closed cell expanded neoprene cord Type 2, Class C, Grade 2C2.

2.2 BOND-BREAKER

Bond-breaker shall be as recommended by the sealant manufacturer to prevent

adhesion of the sealant to backing or to bottom of the joint.

2.3 PRIMER

Primer shall be non-staining type as recommended by sealant manufacturer for the application.

2.4 SEALANT

2.4.1 Latex

Latex Sealant shall be ASTM C 834.

2.4.2 Elastomeric

Elastomeric sealants shall conform to ASTM C 920 and the following:

- a. Polyurethane sealant: Grade NS, Class 25, Use NT.
- b. Silicone sealant: Type S, Grade NS, Class 25, Use NT.

2.4.3 TOILET ROOM SEALANT

For plumbing fixtures, provide white silicone rubber, mildew resistant; GE SCS 1702, Dow Corning 786, or equal.

2.5 SOLVENTS AND CLEANING AGENTS

Solvents, cleaning agents, and accessory materials shall be provided as recommended by the manufacturer.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Surface Preparation

The surfaces of joints to receive sealant or caulk shall be free of all frost, condensation and moisture. Oil, grease, dirt, chalk, particles of mortar, dust, loose rust, loose mill scale, and other foreign substances shall be removed from surfaces of joints to be in contact with the sealant. Oil and grease shall be removed with solvent and surfaces shall be wiped dry with clean cloths. For surface types not listed below, the sealant manufacturer shall be contacted for specific recommendations.

3.1.2 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, the materials shall be removed by sandblasting or wire brushing. Laitance, efflorescence and loose mortar shall be removed from the joint cavity.

3.1.3 Steel Surfaces

Steel surfaces to be in contact with sealant shall be sandblasted or, if sandblasting would not be practical or would damage adjacent finish work, the metal shall be scraped and wire brushed to remove loose mill scale. Protective coatings on steel surfaces shall be removed by sandblasting or by a solvent that leaves no residue.

3.1.4 Aluminum Surfaces

Aluminum surfaces to be in contact with sealants shall be cleaned of temporary protective coatings. When masking tape is used for a protective cover, the tape and any residual adhesive shall be removed just prior to applying the sealant. Solvents used to remove protective coating shall be as recommended by the manufacturer of the aluminum work and shall be non-staining.

3.1.5 Wood Surfaces

Wood surfaces to be in contact with sealants shall be free of splinters and sawdust or other loose particles.

3.2 APPLICATION

3.2.1 Masking Tape

Masking tape may be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Masking tape shall be removed within 10 minutes after joint has been filled and tooled.

3.2.2 Backing

Backing shall be installed to provide the indicated sealant depth. The installation tool shall be shaped to avoid puncturing the backing.

3.2.3 Bond-Breaker

Bond-breaker shall be applied to fully cover the bottom of the joint without contaminating the sides where sealant adhesion is required.

3.2.4 Primer

Primer shall be used on concrete masonry units, wood, or other porous surfaces in accordance with instructions furnished with the sealant. Primer shall be applied to the joint surfaces to be sealed. Surfaces adjacent to joints shall not be primed.

3.2.5 Sealant

Sealant shall be used before expiration of shelf life. Multi-component sealants shall be mixed according to manufacturer's printed instructions. Sealant in guns shall be applied with a nozzle of proper size to fit the width of joint. Joints shall be sealed as detailed in the drawings. Sealant shall be forced into joints with sufficient pressure to expel air and fill the groove solidly. Sealant shall be installed to the indicated

depth without displacing the backing. Unless otherwise indicated, specified, or recommended by the manufacturer, the installed sealant shall be dry tooled to produce a uniformly smooth surface free of wrinkles and to ensure full adhesion to the sides of the joint; the use of solvents, soapy water, etc., will not be allowed. Sealants shall be installed free of air pockets, foreign embedded matter, ridges and sags. Sealer shall be applied over the sealant when and as specified by the sealant manufacturer.

3.3 CLEANING

The surfaces adjoining the sealed joints shall be cleaned of smears and other soiling resulting from the sealant application as work progresses.

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SECTION 08110

STEEL DOORS AND FRAMES

06/02

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SECTION 08110

STEEL DOORS AND FRAMES 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A250.8 (1998) Steel Doors and Frames

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 236	(1989; R 1993) Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box
ASTM C 976	(1990; R 1996) Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box
ASTM D 2863	(1997) Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

DOOR AND HARDWARE INSTITUTE (DHI)

DHI A115.1G (1994) Installation Guide for Doors and Hardware

STEEL DOOR INSTITUTE (SDOI)

SDOI SDI-106	(1996)	Standard Door Type Nomenclature
SDOI SDI-107	(1997)	Hardware on Steel Doors

1.2 SUBMITTALS

(Reinforcement - Application)

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Steel Doors and Frames; GA.

Drawings using standard door type nomenclature in accordance with SDOI SDI-106 indicating the location of each door and frame, elevation of each model of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location of anchors for frames, and thicknesses of metal. Drawings shall include catalog cuts or descriptive data for the doors, frames, and weatherstripping including air infiltration data and manufacturers printed instructions.

1.3 DELIVERY AND STORAGE

During shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or shall be provided with temporary steel spreaders at the bottom of each frame; and knockdown type frames shall be securely strapped in bundles. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the ground and under a weathertight covering permitting air circulation. Doors and assembled frames shall be stored in an upright position in accordance with DHI Al15.1G. Abraded, scarred, or rusty areas shall be cleaned and touched up with matching finishes.

1.4 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

PART 2 PRODUCTS

2.1 DOORS AND FRAMES

Doors and frames shall be factory fabricated in accordance with ANSI A250.8 and the additional requirements specified herein. Door grade shall be extra heavy duty (Grade III) unless otherwise indicated on the door and door frame schedules. Exterior doors and frames shall be designation A40 galvanized. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under Section 08700 BUILDERS' HARDWARE. Doors and frames shall be reinforced, drilled, and tapped to receive mortised hinges, locks, latches, and flush bolts as required. Doors and frames shall be reinforced for surface applied hardware. Frames shall be welded type located as shown. Door frames shall be furnished with a minimum of three jamb anchors and one floor anchor per jamb. Anchors shall be not less than 18 gauge steel or 7 gauge diameter wire. For wall conditions that do not allow the use of a floor anchor, an

additional jamb anchor shall be provided. Rubber silencers shall be furnished for installation into factory predrilled holes in door frames; adhesively applied silencers are not acceptable. Where frames are installed in plaster or masonry walls, plaster guards shall be provided on door frames at hinges and strikes. Reinforcing of door assemblies for closers and other required hardware shall be in accordance with ANSI A250.8. Exterior doors shall have top edges closed flush and sealed against water penetration.

2.2 THERMAL INSULATED DOORS

The interior of thermal insulated doors shall be completely filled with rigid plastic foam permanently bonded to each face panel. The thermal conductance (U-value) through the door shall not exceed 0.41 btu/hr times sq f times f when tested as an operational assembly in accordance with ASTM C 236 or ASTM C 976. Doors with cellular plastic cores shall have a minimum oxygen index rating of 22 percent when tested in accordance with ASTM D 2863.

2.3 STOPS

Doors and frames receiving air transfer grilles shall be equipped with plain rectangular steel stops and trim as required. Screws shall be countersunk, flat Philips head type. Unless specifically shown otherwise, frames shall be designed with loose stops on interior or room side of frame.

2.4 LOUVERS

Provide door louvers of size as indicated; see architectural drawings and schedules. Louvers shall be split-Y, security type. Face plate and frame shall be 12 ga. steel. Louvers shall be 18 ga. steel. Steel shall have prime finish. Include insect screen. Provide Air Louvers Model 1500-A, Anemostat Model PLSL, or approved equal.

2.5 FACTORY FINISH

Doors and frames shall be phosphatized and primed with standard factory primer system.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with DHI A115.1G. Preparation for surface applied hardware shall be in accordance with SDOI SDI-107. Rubber silencers shall be installed in door frames after finish painting has been completed; adhesively applied silencers are not acceptable. Weatherstripping shall be installed at exterior door openings to provide a weathertight installation. Hollow metal door frames shall be solid grouted in masonry walls.

3.1.1 Thermal Insulated Doors

Hardware and perimeter seals shall be adjusted for proper operation. Doors shall be sealed weathertight after installation of hardware and shall be in accordance with Section 07900 JOINT SEALING.

3.2 FIELD PAINTED FINISH

Steel doors and frames shall be field painted in accordance with Section 09900 PAINTING, GENERAL. Weatherstrips shall be protected from paint. Finish shall be free of scratches or other blemishes. Color shall be selected by Contracting Officer from manufacturer's standard colors.

-- End of Section --

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SECTION 08330

OVERHEAD ROLLING DOORS

06/02

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SECTION 08330

OVERHEAD ROLLING DOORS 06/02

PART 1 GENERAL

1.1 REFERENCES

NEMA ICS 2

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 653	(1997) Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM E 84	(1997a) Surface Burning Characteristics of Building Materials
ASTM E 330	(1996) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS (ASHRAE)

(1993) Industrial Control and Systems

ASHRAE Fund	ament HDBK-IP	(1997)	Handbook,	Fundamentals	I-P	Edition

ASHRAE Fundament HDBK-SI (1997) Handbook, Fundamentals SI Edition

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

	Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993) Industrial Control and Systems Enclosures
ANEMA MG 1	(1993; Rev 1, Rev 2, Rev 3) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code
NFPA 80	(1995) Fire Doors and Fire Windows

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Overhead Rolling Door Unit; GA.

Manufacturer's catalog data, test data, and summary of forces and loads on the walls/jambs.

SD-04 Drawings

Overhead Rolling Door Unit; GA

Drawings showing the location of each door including schedules. Drawings shall include elevations of each door type, details and method of anchorage, details of construction, location and installation of hardware, shape and thickness of materials, details of joints and connections, and details of guides, controls, and other fittings.

SD-06 Instructions

Overhead Rolling Door Unit; FIO

Manufacturer's preprinted installation instructions.

SD-14 Samples

Overhead Rolling Door Unit; GA

Manufacturer's standard color samples of factory applied finishes.

1.3 DESCRIPTION

Overhead rolling doors shall be spring counterbalanced, rolling type, with interlocking slats, complete with guides, fastenings, hood, brackets, and operating mechanisms, and shall be designed for use on openings as indicated. Each door shall be provided with a permanent label showing the manufacturer's name and address and the model/serial number of the door.

1.3.1 Wind Load Requirements

Doors and components shall be designed to withstand the minimum design wind load of 960 pa 20 psf. Doors shall be constructed to sustain a superimposed load, both inward and outward, equal to 1-1/2 times the minimum design wind load. Calculations shall be provided that prove the door design meets the design windload requirements. Recovery shall be at least 3/4 of the maximum deflection within 24 hours after the test load is removed. Sound

engineering principles may be used to interpolate or extrapolate test results to door sizes not specifically tested.

1.3.2 Operational Cycle Life

All portions of the door and door operating mechanism that are subject to movement, wear, or stress fatigue shall be designed to operate through a minimum number of 10 days. One complete cycle of door operation is defined as when the door is in the closed position.

1.4 DELIVERY AND STORAGE

Doors shall be delivered to the jobsite wrapped in a protective covering with the brands and names clearly marked thereon. Doors shall be stored in a dry location that is adequately ventilated and free from dirt and dust, water, and other contaminants, and in a manner that permits easy access for inspection and handling.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period shall be provided.

1.6 OPERATION AND MAINTENANCE MANUALS

Operating instructions and outlining the step-by-step procedures required for manual door and shutter operation for the overhead rolling door unit shall be provided. The instructions shall include the manufacturer's name model number, service manual, parts list, and brief description of all equipment and their basic operating features. Maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, troubleshooting guides, and simplified diagrams for the equipment as installed shall be provided. A complete list of parts and supplies, source of supply, and a list of the high mortality maintenance parts shall be provided.

PART 2 PRODUCTS

2.1 OVERHEAD ROLLING DOORS

Doors shall be surface-mounted type with guides at jambs set back a sufficient distance to clear the opening. Exterior doors shall be mounted on interior side of walls.

2.1.1 Curtains

The curtains shall roll up on a barrel supported at the head of opening on brackets, and shall be balanced by helical torsion springs. Steel slats for doors less than 15 feet wide shall be minimum bare metal thickness of 0.0269 inches. Slats shall be of the minimum bare metal decimal thickness required for the width indicated and the wind pressure specified above.

2.1.1.1 Insulated Curtains

The slat system shall supply a minimum R-value of 6.00 when calculated in accordance with ASHRAE Fundament HDBK-IP and ASHRAE Fundament HDBK-SI. Slats shall consist of a urethane core not less than 11/16-inch thick, completely enclosed within metal facings. Exterior face of slats shall be gauge as specified for curtains. Interior face shall be not lighter than 0.0209 inches. The insulated slat assembly shall have a flame spread rating of not more than 25 and a smoke development factor of not more than 50 when tested in accordance with ASTM E 84.

2.1.2 Endlocks and Windlocks

The ends of each alternate slat for interior doors shall have iron endlocks of manufacturer's stock design. In addition to endlocks, non-rated exterior doors shall have the manufacturer's standard windlocks as required to withstand the wind load. Windlocks shall prevent the curtain from leaving quides because of deflection from specified wind pressure.

2.1.3 Bottom Bar

The curtain shall have a standard bottom bar consisting of two hot-dip galvanized steel angles for steel doors.

2.1.4 Guides

Guides shall be steel structural shapes or formed steel shapes, of a size and depth to provide proper clearance for operation and resistance under the design windload. Guides shall be attached to adjoining construction with fasteners recommended by the manufacturer. Spacing of fasteners shall be as required to meet the minimum design windload.

2.1.5 Barrel

The barrel shall be steel pipe or commercial welded steel tubing of proper diameter for the size of curtain. Deflection shall not exceed 0.03 inch per foot of span under full load.

2.1.6 Springs

Oil tempered helical steel counter-balanced torsion springs shall be installed within the barrel and shall be capable of producing sufficient torque to assure easy operation of the door curtain. Access shall be provided for spring tension adjustment from outside of the bracket without removing the hood.

2.1.7 Brackets

Brackets shall be of steel plates to close the ends of the roller-shaft housing, and to provide mounting surfaces for the hood. An operation bracket hub and shaft plugs shall have sealed prelubricated ball bearings.

2.1.8 Hoods

Hoods shall be steel with minimum bare metal thickness of 0.0209 inches formed to fit contour of the end brackets, and shall be reinforced with steel rods, rolled beads, or flanges at top and bottom edges. Multiple segment and single piece hoods shall be provided with support brackets of the manufacturer's standard design as required for adequate support.

2.1.9 Weatherstripping

Exterior doors shall be fully weatherstripped. A compressible and replaceable weather seal shall be attached to the bottom bar. Weather seal at door guides shall be continuous vinyl or neoprene, bulb or leaf type, or shall be nylon-brush type. A weather baffle shall be provided at the lintel or inside the hood. Weatherstripping shall be easily replaced without special tools.

2.1.10 Operation

Doors shall be operated by means of manual crank. Equipment shall be designed and manufactured for usage in non-hazardous, and Group areas.

2.1.10.1 Manual Operation

Operation shall be by means of a vertical shaft, gear box, and reduction gearing and awning-type handle. Gears shall be of high grade gray cast-iron. Gear reduction shall be provided to reduce pressure exerted on the crank to not over 35 pounds.

2.1.11 Locking

Locking shall consist of two locking discs or slide bolts provided on each interior edge of door, suitable for padlock by others, for crank operated doors.

2.1.12 Finish

Steel slats and hoods shall be hot-dip galvanized G60 in accordance with ASTM A 653, and shall be treated for paint adhesion and shall receive a factory baked-on finish coat. The paint system shall withstand a minimum of 1,500 hours without blistering, bubbling, or rust. Surfaces other than slats, hood, and faying surfaces shall be cleaned and treated to assure maximum paint adherence and shall be given a factory dip or spray coat of rust inhibitive metallic oxide or synthetic resin primer. Color shall be selected by Contracting Officer from manufacturer's standard colors.

PART 3 EXECUTION

3.1 INSTALLATION

Doors shall be installed in accordance with approved detail drawings and manufacturer's instructions. Anchors and inserts for guides, brackets, hardware, and other accessories shall be accurately located. Upon completion, doors shall be free from warp, twist, or distortion. Doors shall be lubricated, properly adjusted, and demonstrated to operate freely.

Fire doors shall be installed in conformance with the requirements of NFPA 80 and the manufacturer's instructions.

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SECTION 08625

TUBLULAR SKYLIGHTS

06/02

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-- End of Section Table of Contents --

SECTION 08625

TUBLULAR SKYLIGHTS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Accross the Specimen.
ASTM E 330	(1997) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
ASTM E 331	(1996) Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

UNIFORM BUILDING CODE (UBC)

UBC (1997) Uniform Building Code

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Shop Drawings ; GA.

Submit shop drawings showing construction, dimensions, and details of all components.

SD-09 Reports

Test Reports ; GA.

Submit certified, independent laboratory test reports showing compliance with the performance requirements specified below.

1.3 PERFORMANCE REQUIREMENTS

1.3.1 Air Infiltration

Air infiltration maximum 0.10 cfm per ft of crack length at 6.24 psf pressure differential when tested in accordance with ASTM E 283.

1.3.2 Water Resistance

No uncontrolled water leakage at 6.00 psf pressure differential with water rate of 5 gal/hour/sq ft when tested in accordance with ASTM E 331.

1.3.3 Uniform Load Deflection

No breakage, permanent damage to fasteners, hardware parts, or damage to make tubular skylight inoperable at both a positive and a negative load complying with requirements of the UBC. All tests shall be in accordance with ASTM E 330.

1.3.4 Uniform Load Structural

Unit to be tested at 3 X positive wind and 2 X negative wind pressure design wind pressure, acting normal to plane of roof in accordance with ASTM E 330. No breakage, permanent damage to fasteners, hardware parts, or damage to make tubular skylight inoperable or permanent deflection of any section in excess of 0.2% of its span.

PART 2 PRODUCTS

2.1 TUBLUAR SKYLIGHTS

2.1.1 Roof Dome

Injection molded polycarbonate classified as CC1 material. Thickness shall be not less than 0.125". Visible light transmission shall be 92 percent or greater. Roof dome shall contain a series of concentric, light refracting etched lines a minimum of 2" high to improve light input when sun is low on horizon.

2.1.2 Ceiling Diffuser

Injection molded, acrylic plastic classified as CC2 Plexiglas. Thickness shall be not less than 0.087". Provide prismatic design to maximize light output.

2.1.3 Roof Flashing

Aluminized steel manufactured in a single piece without seams, joints or welds and pitched for roof slope.

2.1.4 Main Tube and Reflector

Fabricate from aluminum sheet meeting the requirements of ASTM B 209, alloy and temper as required by manufacturer to suit forming operations and finish requirements, .020 inch thick. Provide exposed aluminum surface with high polished specular finish. Specular reflectance to be 92 percent and total reflectance to be 95 percent.

2.1.5 Accessories

2.1.5.1 Dress Ring

Dress Ring: 30 percent talc filled polypropylene or high impact ABS.

2.1.5.2 Sealant

Sealant: Polyurethane or copolymer - based elastomeric sealant as recommended by skylight manufacturer.

2.1.5.3 Weather Seal

Weather Seal: Medium density pile weatherstripping and light density polyvinyl chloride foam tape or UV resistant EPDM rubber.

2.1.5.4 Ceiling Diffuser Seal

Ceiling Diffuser Seal: Closed cell polyethylene foam, 3 lb per cu ft, and white polyvinyl chloride seal butt joint welded or EPDM rubber.

2.1.5.5 Fasteners

Fasteners: Same as metals being fastened or non-magnetic stainless steel or other non-corrosive metal as recommended by skylight manufacturer.

2.1.6 Fabrication

Finish, fabricate, and shop prepare all assemblies under responsibility of one manufacturer. Fabricate to allow for thermal movement of materials when subject to a temperature differential from -30 degrees F to +180 degrees F. Provision shall be made to insure that water will not accumulate and remain in contact within system components.

PART 3 EXECUTION

3.1 INSTALLATION

Install skylights in accordance with shop drawings and manufacturer's recommendations.

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SECTION 08700

BUILDERS' HARDWARE

06/02

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SECTION 08700

BUILDERS' HARDWARE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage
	Through Exterior Windows, Curtain Walls
	and Doors Under Specified Pressure
	Differences Across the Specimen

ASTM F 883 (1997) Padlocks

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA L & R Directory	(Effective thru Jun 1999) Directory of Certified Locks & Latches
BHMA Closer Directory	(Effective thru Jul (1999) Directory of Certified Door Closers
BHMA Exit Devices Directory	(Effective thru Aug 1998) Directory of Certified Exit Devices
внма а156.1	(1997) Butts and Hinges
ВНМА А156.2	(1996) Bored and Preassembled Locks and Latches
BHMA A156.3	(1994) Exit Devices
внма а156.4	(1992) Door Controls - Closers
ВНМА А156.5	(1992) Auxiliary Locks & Associated Products
внма а156.6	(1994) Architectural Door Trim
внма а156.7	(1997) Template Hinge Dimensions
внма а156.8	(1994) Door Controls - Overhead Stops and

	Holders
BHMA A156.13	(1994) Mortise Locks & Latches
BHMA A156.15	(1995) Closer Holder Release Devices
BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.17	(1993) Self Closing Hinges & Pivots
BHMA A156.18	(1993) Materials and Finishes
внма А156.19	(1997) Power Assist and Low Energy Power Operated Doors
BHMA A156.20	(1996) Strap and Tee Hinges and Hasps
BHMA A156.21	(1996) Thresholds
BHMA A156.23	(1992) Electromagnetic Locks
ВНМА А156.24	(1992) Delayed Egress Locks
DOOR AND HARDWARE INSTIT	TUTE (DHI)
DHI Keying Systems	(1989) Keying Systems and Nomenclature
DHI Locations for CSD	(1997) Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames
DHI Locations for SSD	(1990) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
DHI ANSI/DHI A115.1G	(1994) Installation Guide for Doors and Hardware
DHI ANSI/DHI A115-W	(Varies) Wood Door Hardware Standards (Incl All5-W1 thru Al15-W9)
NATIONAL FIRE PROTECTION	N ASSOCIATION (NFPA)
NFPA 80	(1999) Fire Doors and Fire Windows
NFPA 101	(1997; Errata 97-1; TIA-97-1) Life Safety

1.2 SUBMITTALS

NFPA 105

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The

Assemblies

Code

(1999) Installation of Smoke-Control Door

following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Hardware List and Manufacturer's Data; GA

List of proposed hardware. Manufacturer's descriptive data, catalogue cuts.

SD-04 Drawings

Hardware; GA

List of materials proposed layout of materials, relationship of hardware to other parts of the work, dimensions, and installation instructions.

SD-07 Schedules

Hardware Schedule; GA.

Hardware schedule listing all items to be furnished. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; the ANSI number specified, sizes; detail information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

Keying Schedule; GA.

Keying schedule developed in accordance with DHI Keying Systems, after the keying meeting with the Contracting Officer.

SD-19 Operation and Maintenance Manuals

Hardware; GA

Operating and maintenance instructions shall include manufacturer's name model number, service manual, part lists, routine maintenance instructions listing routine maintenance procedures and repairs.

1.3 PREDELIVERY CONFERENCE

Upon approval of the Hardware Schedule, the construction Contractor shall arrange a conference with the hardware supplier, Contracting Officer and the using agency to determine keying system requirements. Location of the key control storage system, set-up and key identification labeling will also be determined.

1.4 DELIVERY, STORAGE, AND HANDLING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be

properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

1.5 SPECIAL TOOLS

Special tools, such as those supplied by the manufacturer, unique wrenches, and dogging keys, shall be provided as required to adjust hardware items.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.7 OPERATION AND MAINTENANCE MANUALS

Six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides shall be provided. The instructions for electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices shall include simplified diagrams as installed.

PART 2 PRODUCTS

2.1 GENERAL HARDWARE REQUIREMENTS

Hardware shall conform to the requirements specified herein and the HARDWARE SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings.

2.2 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

2.3 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

2.4 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks, and all components thereof, including cylinders and removable cores, shall be the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded.

2.4.1 Mortise Lock and Latchsets

Mortise lock, latchsets, and strikes shall be series 1000 and shall conform to BHMA A156.13, operational Grade 1. Mortise type locks and latches for doors 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks shall have armored fronts.

2.4.2 Auxiliary Locks and Associated Products

Bored and mortise dead locks and dead latches, narrow style dead locks and dead latches, rim latches, dead latches, and dead bolts, and electric strikes shall conform to BHMA A156.5. Bolt and latch retraction shall be dead bolt style. Strike boxes shall be furnished with dead bolt and latch strikes for Grade 1.

2.4.3 Lock Cylinders (Mortise, Rim and Bored)

Lock cylinders shall comply with BHMA A156.5. Lock cylinders shall be constructed of brass, bronze, stainless steel, or nickel silver. Lock cylinder shall have not less than six pins. Construction interchangeable cores shall be provided. Disassembly of knob or lockset shall not be required to remove core from lockset. All locksets, lockable exit devices, and padlocks shall accept same interchangeable cores.

2.4.4 Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirement of BHMA A156.2 or BHMA A156.13, knobs, lever handles, roses, and escutcheons shall be 0.050 inch thick, if unreinforced. If reinforced, the outer shell shall be 0.035 inch thick and the combined thickness shall be 0.070 inch except that knob shanks shall be 0.060 inchthick. Knob diameter shall be 2-1/8 to 2-1/4 inches.Lever handles shall be of plain design with ends returned to no more than 1/2 inch from the door face.

2.5 KEYING

Locks shall be keyed in sets or subsets as scheduled. Locks shall be furnished with the manufacturer's standard construction key system. Change keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks: 3 change keys each lock.

Master keyed sets: 5 keys each set. Grandmaster keyed sets 5 keys each set. Blanks 1 for each lock.

The keys shall be furnished to the Contracting Officer arranged in sets or subsets as scheduled. Permanent keys shall be sent by the lock manufacturer directly to the Contracting Officer by registered mail or other approved means.

2.5.1 Keying Schedule

The Contractor shall meet with the Contracting Officer to review keys to be provided and shall provide keying schedule prior to providing keys and locks.

2.6 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified. The opening resistance of closing devices shall not exceed 15 1bf applied at the latch stile or exceed 5 1bfwhere low opening resistance is scheduled.

2.7 DOOR CONTROLS - OVERHEAD HOLDERS

Door controls - overhead holders shall conform to BHMA A156.8.

2.8 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

2.8.1 Door Protection Plates

2.8.1.1 Kick Plates

Kick plates shall be Type J102 stainless steel. Width of plates shall be 2 inches less than door width for single doors and 1 inchless for pairs of doors. Height shall be 12 inches. Edges of metal plates shall be beveled.

2.8.2 Push Plates

2.8.2.1 Flat Plates

Flat plates shall be Type J301 0.50 inch thick stainless steel. Edges of metal plates shall be beveled.

2.8.3 Door Pulls and Push/Pull Units

2.8.3.1 Door Pulls

Door pulls shall be Category J400 stainless steel of plain modern design. Pulls for hollow metal, mineral core wood or kalamein doors shall be Type J405 thru-bolted to Type J301 flat push plates.

2.9 AUXILIARY HARDWARE

Auxiliary hardware, consisting of door holders shall conform to BHMA A156.16. Lever extension flush bolts shall be Type L14081. Dust-proof strikes shall be Type L04011 for doors that are not fire rated. Other auxiliary hardware shall conform to BHMA A156.16.

2.10 MISCELLANEOUS

2.10.1 Metal Thresholds

Thresholds shall conform to BHMA A156.21. Thresholds for exterior doors shall be extruded aluminum of the type indicated and shall provide proper clearance and an effective seal with specified weather stripping. Where required, thresholds shall be modified to receive projecting bolts of flush bolts. Thresholds for doors accessible to the handicapped shall be beveled with slopes not exceeding 1:2 and with heights not exceeding 1/2 inch. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.10.2 Rain Drips

Extruded aluminum, not less than 0.07 inch thick, mill finished. Overhead rain drips shall be approximately 1-1/2 inches high by 2-1/2 inches projection and shall extend 2 inches on either side of the door opening width.

2.10.3 Aluminum Housed Type Weatherseals

Weatherseals of the type indicated shall consist of extruded aluminum retainers not less than 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be clear (natural) anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.11 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be one-way or other approved tamperproof type.

2.12 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18. Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

PART 3 EXECUTION

3.1 APPLICATION

Hardware shall be located in accordance with DHI Locations for CSD and DHI Locations for SSD, except that deadlocks shall be mounted 48 inches above

finish floor,unless otherwise shown or specified. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI ANSI/DHI Al15.1G or DHI ANSI/DHI Al15-W. Door control devices for exterior doors such as closers and holders, shall be attached to doors with thru bolts and nuts or sex bolts. Alternate fastening methods may be approved by the Contracting Officer when manufacturers' documentation is submitted to verify that the fastening devices and door reinforcements are adequate to resist wind induced stresses. Electric hardware items and access control devices shall be installed in accordance with manufacturer's printed installation procedures.

3.1.1 Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

3.1.2 Kick Plates and Mop Plates

Kick plates shall be installed on the push side of single-acting doors and on both sides of double-acting doors. Mop plates shall be installed on the pull side of the single acting doors.

3.1.3 Auxiliary Hardware

Lever extension flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. The bottom bolt shall operate into a dust-proof floor strike or threshold.

3.1.4 Thresholds

Thresholds shall be secured with a minimum of three fasteners per single door width and six fasteners per double door width with a maximum spacing of 12 inches. Exterior thresholds shall be installed in a bed of sealant with expansion anchors and stainless steel screws, except that bronze or anodized bronze thresholds shall be installed with expansion anchors with brass screws. Minimum screw size shall be No. 10 length, dependent on job conditions, with a minimum of 3/4 inchthread engagement into the floor or anchoring device used.

3.1.5 Rain Drips

Door sill rain drips shall align with the bottom edge of the door. Overhead rain drips shall align with bottom edge of door frame rabbet. Drips shall be set in sealant and fastened with stainless steel screws.

3.1.6 Weatherseals

Weatherseals shall be located as indicated, snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

3.2 HARDWARE SETS

Products identified in this Section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality, type and function. Products of other manufacturers may be submitted for those listed, provided the substitution is equal in quality, type, and function and meets the requirements specified.

3.2.1 Group 1 - Toilet and Changing Room

1-1/2 Pair Butts: Stanley FBB 199 4-1/2 x 4-1/2 x NRP 1 Deadlock: Corbin Russwin DL4017 (installed 60" A.F.F.) 1 Push: 8" x 16" x 16 ga. 1 Pull: Brookline 807 1 Closer: Corbin Russwin DC2200 x A4 x M72 (Low Opening Resistance) 1 Threshold: Reese S204A 1 Sweep: Reese 712 1 Wallstop	626 626 630 630 689 Alum. DUR
1 Kickplate: 12" x 2" L.D.W. 1 Raindrip	630

3.2.2 Group 2 - Mechanical Room

1-1/2 Pair Butts: Stanley FBB 199 4-1/2 x 4-1/2 x NRP	626
1 Lockset: Corbin Russwin ML2255 x LSA	626
1 O.H. Holder: Corbin Russwin DH5202	626
1 Threshold: Reese S204A	Alum.
1 Sweep: Reese 712	DUR
1 Raindrip	

-

Each door shall receive:

3.2.3 Group 3 - Vending

1-	1/2 Pair Butts: Stanley FBB 199 4-1/2 x 4-1/2 x NRP-Hinges shall	626
	Provide Full 180 degree opening of door in open position.	
1	Lockset (active): Corbin Russwin ML2255 x LSA	626
2	Flush Bolts (inactive): Ives 458	626
1	Threshold: Reese S204A	Alum.
1	Sweep: Reese 967	DUR
1	Astragal: Reese 87	DUR

Holder/Stop

At door locations with concrete walks (see drawings)

- 1 Cane Bolt: Stanley CD1009, 12 inch. US2C
 - Coordinate location of drilled hole in concrete slab for door in full open position.
- 1 Wallstop

At door locations with no concrete walk (see drawings)

- 1 Wall type holder: Glynn-Johnson W45AX Alum.
- 1 Raindrip

3.2.4 Group 4 - Pump House

1-1/2 Pair Butts:	Stanley FBB 199	$4-1/2 \times 4-1/2 \times NRP$	626
1 Lockset (active)	: Corbin Russwin	n ML2255 x LSA	626

1 Closer: Corbin Russwin DC2200 x A5 x M72 630
1 Threshold: Reese S204A Alum.
1 Sweep: Reese 967 DUR
1 Rain Drip
1 Weatherseal Alum.

-- End of Section --

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SECTION 09260

GYPSUM BOARD SYSTEMS

06/02

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SECTION 09260

GYPSUM BOARD SYSTEMS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 36	(1997) Gypsum Wallboard
ASTM C 475	(1994) Joint Compound and Joint Tape for Finishing Gypsum Board
ASTM C 840	(1997) Application and Finishing of Gypsum Board
ASTM C 1002	(1996a) Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases
ASTM C 1047	(1995) Accessories for Gypsum Wallboard and Gypsum Veneer Base

1.2 DELIVERY, STOARAGE, AND HANDLING

Schedule delivery to minimize storage periods at project site. Deliver materials in accordance with manufacturer's instructions; ship unopened containers or packages, fully identified with manufacturer's name, brand, type and grade. Store boards flat with uniform support. Protect from weather and damage as recommended by manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE GYPSUM BOARD MANUFACTURERS

Products identified in this Section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality, type, and function. Unless otherwise indicated, gypsum board products and accessories of the following manufacturers, or approved equal, may be substituted for those listed, provided the substitution is equal in quality, type, and function and meets the specified requirements:

- a. Georgia-Pacific (G-P).
- b. National Gypsum/Gold Bond Building Products Div. U. S. Gypsum (USG).

2.2 INTERIOR GYPSUM BOARD

Exposed Board Surface: 5/8" thick gypsum wallboard unless otherwise indicated, complying with ASTM C 36, with paper face surface suitable to receive decorated finish and long edges tapered to receive standard joint treatment, in lengths as required for minimum number of joints.

2.3 GYPSUM BOARD FASTENERS

2.3.1 General

Provide type and size recommended by manufacturer for applications shown. Review fire-rated assembly requirements for fastener spacing. In general, fasten gypsum board with self-drilling screws designed for gypsum board, ASTM C 1002.

2.3.2 Screws

Screws shall be self-tapping when used with metal framing up to 12 gage. Heads shall be designed for covering with finishing compound if exposed in face layers.

2.4 GYPSUM BOARD METAL TRIM ACCESSORIES

Provide trim accessories of sizes required for applications shown, fabricated of galvanized steel, complying with ASTM C 1047 as follows:

2.4.1 External Corners

Metal corner bead with smooth rigid nose and perforated and knurled metal flanges.

2.4.2 Control Joints

Where shown and as required in Part 3 Execution of this section, one-piece joint assembly of non-corrosive metal or extruded vinyl with continuous unperforated V-slot for insertion into joint and perforated flanges for attachment to face of gypsum board with slot opening covered with removable strip.

2.4.3 Where Face Panels Abut Dissimilar Materials, at Reveals, and Where Designated:

Shaped metal trim designed to be concealed by taping operations; USG No. 200-B metal trim, Fry Reglet FDM-625, or approved equal.

2.4.4 Exposed Panel Edges and Where Designated

J-shape casing beads designed to be concealed by taping.

2.5 JOINT TREATMENT MATERIALS

2.5.1 Joint Tape

Joint Tape: Plain or perforated paper, ASTM C 475.

2.5.2 Joint Compound

Joint Compound: Factory-prepackaged vinyl based products, ASTM C 475. Provide in dry powder form for mixing with water at jobsite or factory pre-mixed, for single or two-compound treatment.

2.5.3 Taping Compound

Taping compound shall be formulated for embedding tape and first coat over fasteners and flanges of corner beads and edge trim.

2.5.4 Topping Compounds

Topping compounds shall be formulated for fill (second) and finish (third) coats.

2.5.5 All Purpose Compounds

All purpose compounds shall be formulated for use as both taping and topping compounds.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 General

Comply with ASTM C 840, unless otherwise recommended by gypsum board manufacturer.

3.1.2 Examination of Conditions

Examine substrates and conditions; notify of detrimental conditions. Do not proceed until unsatisfactory conditions are corrected.

3.1.3 Tolerances

Do not exceed 1/8" in 8'-0" variation from plumb or level in line or surface; except at joints between units, do not exceed 1/16" variation between planes of abutting edges or ends. Shim as required to comply with specified tolerances.

3.1.4 Framing and Blocking

Provide additional framing and blocking as required to support gypsum board at openings and cutouts, and to support built-in anchorage and attachment devices for other work.

3.1.5 Control Joints

Form control joints in gypsum board construction where indicated below. Allow 1/2" continuous opening between edges of adjacent drywall boards to allow for insertion of control joint trim accessory.

3.2 SINGLE-LAYER GYPSUM BOARD APPLICATIONS

3.2.1 Partition/Walls

Partition/Walls: For heights of 8'-1" or less, apply gypsum board vertically or horizontally at contractor's option. For heights greater than 8'-1" or for areas less than 4' wide, apply vertically. Use floor-to-ceiling length boards for vertical applications and locate edge joints over supports, but offset at least one stud on opposite faces of partition/walls. Use maximum practical length boards for horizontal applications and locate end joints over supports and stagger in alternate courses of board.

3.2.2 Ceilings

Ceilings: Apply gypsum board with long dimension at right angles to supports with end butt joints located over supports. Use maximum practical length boards to minimize end butt joints. Stagger end joints in alternate courses of boards and locate as far away from center of ceiling as possible.

3.2.3 Supports

Supports: Fasten gypsum board with screws. Comply with manufacturer's instructions for fastening, but do not exceed 12" o.c. spacing.

3.3 CONTROL JOINTS

Gypsum panel surfaces shall be isolated with control joints where:

- a. Partition, furring, or column fireproofing abuts a structural element (excepts floor) or dissimilar wall or ceiling.
- b. Ceiling abuts a structural element, dissimilar wall or partition, or other vertical penetration.
- c. Construction changes within plane of partition or ceiling.
- d. Partition or furring run exceeds 30 ft.
- e. Wings of "L", "U" and "T"-shaped ceiling areas are joined.

3.4 GYPSUM BOARD FINISHING

3.4.1 Temperature and Ventilation

Do not install joint treatment compounds unless conditions comply with minimum temperature and ventilation requirements recommended by manufacturer.

3.4.2 Finishing

Finish exposed gypsum board surfaces with joints, corners, and exposed edges reinforced or trimmed as specified, and with joints, fasteners, accessory flanges, and surface defects filled with joint compound in accordance with manufacturer's recommendations for a smooth, flush surface.

3.4.3 Acceptance

Gypsum board finishing work will not be considered acceptable if corners or edges do not form true, level, or plumb lines, or if joints, fastener heads, flanges of accessories, or defects are visible after application.

3.5 PROTECTION

Comply with proper procedures for protection of completed gypsum board work from damage or deterioration until acceptance of work

-- End of Section --

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SECTION 09310

CERAMIC TILE

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SECTION 09310

CERAMIC TILE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.1A	(1992) Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar		
ANSI A108.1B	(1992) Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar		
ANSI A108.5	(1992) Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar		
ANSI A108.10	(1992) Installation of Grout in Tilework		
ANSI A118.1	(1992) Dry-Set Portland Cement Mortar		
ANSI A118.6	(1992) Ceramic Tile Grouts		
ANSI A137.1	(1988) Ceramic Tile		
AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)			
ASTM C 373	(1988; R 1994) Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products		
ASTM C 648	(1998) Breaking Strength of Ceramic Tile		
ASTM C 1026	(1987; R 1996) Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling		
ASTM C 1027	(1984; R 1990) Determining Visible		

Abrasion Resistance of Glazed Ceramic Tile

ASTM C 1028 (1996) Determining the Static Coefficient

of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer

Pull-Meter Method

TILE COUNCIL OF AMERICA (TCA)

TCA Hdbk (1997) Handbook for Ceramic Tile

Installation

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-01 Data

Quarry Tile; GA, Glazed Wall Tile; GA.

SD-04 Drawings

Quarry Tile; GA, Glazed Wall Tile; GA

SD-14 Samples

Quarry Tile; GA, Glazed Wall Tile; GA.

Samples of sufficient size to show color range, pattern, type and joints.

1.3 DELIVERY AND STORAGE

Materials shall be delivered to the project site in manufacturer's original unopened containers with seals unbroken and labels and hallmarks intact. Materials shall be kept dry, protected from weather, and stored under cover in accordance with manufacturer's instructions.

1.4 ENVIRONMENTAL REQUIREMENTS

Ceramic tile work shall not be performed unless the substrate and ambient temperature is at least 50 degrees F and rising. Temperature shall be maintained above 50 degrees F while the work is being performed and for at least 7 days after completion of the work. When temporary heaters are used they shall be vented to the outside to avoid carbon dioxide damage to new tilework.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period shall be provided.

PART 2 PRODUCTS

2.1 TILE

Tile shall be standard grade conforming to ANSI A137.1. Containers shall be grade sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate. Tile shall be impact resistant with a minimum breaking strength for wall tile of 90 lbs and 250 lbs for floor tile in accordance with ASTM C 648. Tile for cold climate projects shall be rated frost resistant by the manufacturer as determined by ASTM C 1026. Water absorption shall be 0.50 maximum percent in accordance with ASTM C 373. Floor tile shall have a minimum coefficient of friction of 0.60 wet and dry in accordance with ASTM C 1028. Floor tile shall be Class IV-Heavy Traffic, durability classification as rated by the manufacturer when tested in accordance with ASTM C 1027for abrasion resistance as related to foot traffic.

2.1.1 Quarry Tile

Quarry tile and trim shall be unglazed with smooth surface. Tile shall be 6 x 6 x 1/2 inch. Color shall be selected by the Contracting Officer from manufacturer's standard colors.

2.1.2 Glazed Wall Tile

Where ceramic base is indicated in rooms with concrete floor, provide 4-1/2" high x 4-1/2" long glazed tile specifically designed for this application, with cove base and rounded top. Color shall be selected by the Contracting Officer from manufacturer's standard colors.

2.2 MORTAR, GROUT, AND ADHESIVE

Mortar, grout, and adhesive shall conform to the following:

2.2.1 Dry-Set Portland Cement Mortar

ANSI A118.1.

2.2.2 Ceramic Tile Grout

ANSI A118.6;

PART 3 EXECUTION

3.1 PREPARATORY WORK AND WORKMANSHIP

Surface to receive tile shall be inspected and shall conform to the requirements of ANSI A108.1A or ANSI A108.1B for surface conditions for the type setting bed specified and for workmanship. Variations of surface to be tiled shall fall within maximum values shown below:

TYPE	WALLS	FLOORS
Dry-Set Mortar Organic Adhesives	1/8 inch in 8 ft. 1/8 inch in 8 ft.	1/8 inch in 10 ft. 1/16 inch in 3 ft.
Latex portland cement mortar	,	1/8 inch in 10 ft.

TYPE WALLS FLOORS
Epoxy 1/8 inch in 8 ft. 1/8 inch in 10 ft.

3.2 GENERAL INSTALLATION REQUIREMENTS

Tile work shall not be started until roughing in for mechanical and electrical work has been completed and tested, and built-in items requiring membrane waterproofing have been installed and tested. Floor tile installation shall not be started in spaces requiring wall tile until after wall tile has been installed. Tile in colors and patterns indicated shall be applied in the area shown on the drawings. Tile shall be installed with the respective surfaces in true even planes to the elevations and grades shown. Special shapes shall be provided as required for sills, jambs, recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation. Tile bases and coves shall be solidly backed with mortar.

3.3 INSTALLATION OF WALL TILE

Wall tile shall be installed in accordance with the TCA Hdbk, method W202.

3.3.1 Dry-Set Mortar and Latex-Portland Cement Mortar

Dry-set shall be used to install tile in accordance with ANSI A108.5. Latex portland cement shall be used when installing porcelain ceramic tile.

3.4 INSTALLATION OF FLOOR TILE

Floor tile shall be installed in accordance with TCA \mbox{Hdbk} , methods $\mbox{F113}$ and $\mbox{F115}$.

3.4.1 Dry-Set and Latex-Portland Cement

Dry-set mortar shall be used to install tile directly over properly cured, plane, clean concrete slabs in accordance with ANSI A108.5. Latex portland cement shall be used when installing porcelain ceramic tile.

3.4.2 Ceramic Tile Grout

Ceramic Tile grout shall be prepared and installed in accordance with ANSI Al08.10.

3.5 EXPANSION JOINTS

Joints shall be formed as indicated and sealed as specified in Section 07900 JOINT SEALING.

3.5.1 Walls

Expansion joints shall be provided at control joints in backing material. Wherever backing material changes, an expansion joint shall be installed to separate the different materials.

3.5.2 Floors

Expansion joints shall be provided over construction joints, control joints, and expansion joints in concrete slabs. Expansion joints shall be provided where tile abuts restraining surfaces such as perimeter walls, curbs and columns and at intervals of 24 to 36 feet each way in large interior floor areas and 12 to 16 feet each way in large exterior areas or areas exposed to direct sunlight or moisture. Expansion joints shall extend through setting-beds and fill.

3.6 CLEANING AND PROTECTING

Upon completion, tile surfaces shall be thoroughly cleaned in accordance with manufacturer's approved cleaning instructions. Acid shall not be used for cleaning glazed tile. Floor tile with resinous grout or with factory mixed grout shall be cleaned in accordance with instructions of the grout manufacturer. After the grout has set, tile wall surfaces shall be given a protective coat of a noncorrosive soap or other approved method of protection. Tiled floor areas shall be covered with building paper before foot traffic is permitted over the finished tile floors. Board walkways shall be laid on tiled floors that are to be continuously used as passageways by workmen. Damaged or defective tiles shall be replaced.

-- End of Section --

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SECTION 09900

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06/02

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SECTION 09900

PAINTING, GENERAL 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Limit Values (1996) Threshold Limit Values for Chemical Substances and Physical Agents and Biological exposure Indices

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4214 (1998) Evaluating Degree of Chalking of Exterior Paint Films

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1632 (Basic) Varnish, Asphalt

CID A-A-2867 Coating, Polyurethane, Single Component Moisture Cure, Alipathic

CID A-A-2962 (Rev A) Enamel, Alkyd (Metric)

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 5	(1995) Zinc Dust, Zinc Oxide and Phenolic Varnish Paint
SSPC SP 1	(1982) Solvent Cleaning
SSPC SP 2	(1995) Hand Tool Cleaning
SSPC SP 3	(1995) Power Tool Cleaning
SSPC SP 6	(1994) Commercial Blast Cleaning
SSPC SP 7/NACE 4	(1994) Brush-Off Blast Cleaning

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation;

SD-01 Data

Paint; FIO.

The names, quantity represented, and intended use for the proprietary brands of materials proposed to be used regardless of quantities in states where VOC content limitations apply.

SD-06 Instructions

Mixing and Thinning; FIO. Application; FIO.

Manufacturer's current printed product description, material safety data sheets (MSDS) and technical data sheets for each coating system. Detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing and drying times between coats for epoxy, moisture-curing polyurethane, and liquid glaze coatings. Detailed application instructions for textured coatings shall be provided.

1.3 PACKAGING, LABELING, AND STORING

Paints shall be in sealed containers that legibly show the designated name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints and thinner shall be stored in accordance with the manufacturer's written directions and as a minimum stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors and at temperatures between 40 and 95 degrees F. Paints shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for testing.

1.4 ENVIRONMENTAL CONDITIONS

Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 45 and 95 degrees F when applying coatings other than water-thinned, epoxy, and moisture-curing polyurethane coatings. Water-thinned coatings shall be applied only when ambient temperature is between 50 and 90 degrees F. Epoxy, and moisture-curing polyurethane coatings shall be applied only within the minimum and maximum temperatures recommended by the coating manufacturer. Moisture-curing polyurethane shall not be applied when the relative humidity is below 30 percent.

1.5 SAFETY AND HEALTH

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in the CONTRACT CLAUSES. The Activity Hazard Analysis shall include analyses of the potential impact of painting

operations on painting personnel and on others involved in and adjacent to the work zone.

1.5.1 Worker Exposures

Exposure of workers to hazardous chemical substances shall not exceed limits established by ACGIH Limit Values, or as required by a more stringent applicable regulation.

1.5.2 Toxic Compounds

Toxic products having ineffective physiological warning properties, such as no or low odor or irritation levels, shall not be used unless approved by the Contracting Officer.

1.5.3 Training

Workers having access to an affected work area shall be informed of the contents of the applicable material safety data sheets (MSDS) and shall be informed of potential health and safety hazard and protective controls associated with materials used on the project. An affected work area is one which may receive mists and odors from the painting operations. Workers involved in preparation, painting and clean-up shall be trained in the safe handling and application, and the exposure limit, for each material which the worker will use in the project. Personnel having a need to use respirators and masks shall be instructed in the use and maintenance of such equipment.

1.5.4 Coordination

Work shall be coordinated to minimize exposure of building occupants, other Contractor personnel, and visitors to mists and odors from preparation, painting and clean-up operations.

PART 2 PRODUCTS

2.1 PAINT

The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coat. Paint shall conform to the requirements listed in the painting schedules at the end of this section, except when the required amount of a material of a particular batch is 50 gallons or less, an approved first-line proprietary paint material with similar intended formulation, usage and color to that specified may be used. Additional requirements are as follows:

2.1.1 Colors and Tints

Colors shall be as selected from manufacturer's standard colors, as indicated. Manufacturer's standard color is for identification of color only. Tinting of epoxy and urethane paints shall be done by the

manufacturer. Stains shall conform in shade to manufacturer's standard color. The color of the undercoats shall vary slightly from the color of the next coat.

2.1.2 Lead

Paints containing lead in excess of 0.06 percent by weight of the total nonvolatile content (calculated as lead metal) shall not be used.

2.1.3 Chromium

Paints containing zinc chromate or strontium chromate pigments shall not be used.

2.1.4 Volatile Organic Compound (VOC) Content

Paints shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards and shall conform to the restrictions of the local air pollution control authority.

PART 3 EXECUTION

3.1 PROTECTION OF AREAS NOT TO BE PAINTED

Items not to be painted which are in contact with or adjacent to painted surfaces shall be removed or protected prior to surface preparation and painting operations. Items removed prior to painting shall be replaced when painting is completed. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Surfaces contaminated by coating materials shall be restored to original condition.

3.2 SURFACE PREPARATION

Surfaces to be painted shall be clean and free of foreign matter before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primmed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.2.1 Ferrous Surfaces

Ferrous surfaces including those that have been shop-coated, shall be solvent-cleaned or detergent-washed in accordance with SSPC SP 1. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be cleaned mechanically with hand tools according to SSPC SP 2, power tools according to SSPC SP 3 or by sandblasting according to SSPC SP 7/NACE 4. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

3.2.2 Nonferrous Metallic Surfaces

Galvanized, aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces shall be solvent-cleaned or detergent-washed in accordance with SSPC SP 1.

3.3 MIXING AND THINNING

When thinning is approved as necessary to suit surface, temperature, weather conditions, or application methods, paints may be thinned in accordance with the manufacturer's directions. When thinning is allowed, paints shall be thinned immediately prior to application with not more than 1 pint of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning shall not cause the paint to exceed limits on volatile organic compounds. Paints of different manufacturers shall not be mixed.

3.3.1 Two-Component Systems

Two-component systems shall be mixed in accordance with manufacturer's instructions. Any thinning of the first coat to ensure proper penetration and sealing shall be as recommended by the manufacturer for each type of substrate.

3.4 APPLICATION

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application. Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces. Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

3.4.1 Ventilation

Affected areas shall be ventilated during paint application so that workers exposure to chemical substances shall not exceed established limits.

3.4.2 Respirators

Operators and personnel in the vicinity of operating paint sprayers shall wear respirators.

3.4.3 First Coat

The first coat on surfaces shall include repeated touching up of suction

spots or overall application of primer or sealer to produce uniform color and gloss. Excess sealer shall be wiped off after each application.

3.4.4 Timing

Surfaces that have been cleaned, pretreated, and otherwise prepared for painting shall be given a coat of the specified first coat as soon as practical after such pretreatment has been completed, but prior to any deterioration of the prepared surface. Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit weather conditions. Oil-based or oleoresinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause the undercoat to lift or lose adhesion. Manufacturer's instructions for application, curing and drying time between coats of two-component systems shall be followed.

3.4.5 Ferrous-Metal Primer

Primer for ferrous-metal shall be applied to ferrous surfaces to receive paint other than asphalt varnish prior to deterioration of the prepared surface. The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats.

3.5 SURFACES TO BE PAINTED

Surfaces listed in the painting schedules at the end of this section, other than those listed in paragraph SURFACES NOT TO BE PAINTED, shall be painted as scheduled.

3.6 SURFACES NOT TO BE PAINTED

Surfaces in the following areas shall not be painted:

- 1. Concrete.
- 2. Metals fully embedded in concrete (except aluminum)
- 3. Factory name plates.
- 4. Aluminum items, including guardrail.
- 5. Burnished concrete masonry units.

3.7 CLEANING

Cloths, cotton waste and other debris that might constitute a fire hazard shall be placed in closed metal containers and removed at the end of each day. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint and other deposits on adjacent surfaces shall be removed and the entire job left clean and acceptable.

3.8 PAINTING SCHEDULES

The following painting schedules identify the surfaces to be painted and

prescribe the paint to be used and the number of coats of paint to be applied.

- 3.8.1 Exterior Painting Schedule
- 3.8.1.1 Ferrous Metal and PVC Unprimed, Galvanized & Prefinished

Includes exposed rooftop mechanical equipment, metal and PVC stacks and vents, galvanized flashings, ductwork, equipment supports, mechanical piping, conduit, electrical equipment, panelboards, meter boxes, miscellaneous metal items which shall be painted as follows.

- a. 1 coat rust inhibiting primer, except for galvanized surfaces use 1 coat galvanized metal latex primer. Omit primer on prefinished surfaces, unless required as barrier coat.
- b. 2 coats enamel (alkyd, flat).
- 3.8.1.2 Ferrous Metal Primed & Prefinished

Includes miscellaneous metal fabrications, steel doors and frames, exposed structural lintels which shall be painted as follows.

- a. Touch up bare metal with primer.
- b. 2 coats Effecto Enamel (alkyd, gloss).
- 3.8.1.3 Wood Stained

Includes siding and trim which shall be painted with 2 coats semi-transparent stain.

3.8.1.4 Masonry

Burnished Concrete Masonry Units (BCMU)

- a. Refer to SECTION 04200: Masonry.
- 3.8.2 Interior Painting Schedule
- 3.8.2.1 Block Masonry

Block masonry, where scheduled, shall be painted as follows.

- a. 1 coat block filler.
- b. 2 coats epoxy (water borne, gloss).
- 3.8.2.2 Ferrous Metal Adjacent or Near to Painted Surfaces

Includes factory-primed and baked-enamel-prefinished grills, louvers, ductwork, conduit, piping, electrical panel covers, baseboard radiation, convector cabinets, access covers, equipment enclosures, raceways and similar appurtenances which shall be painted to match adjacent or near

surfaces, except as designated otherwise below.

3.8.2.3 Ferrous Metal - Primed & Finished

Includes touch-up primer and 2 coats enamel (alkyd, gloss).

3.8.2.4 Hardwood - Natural Finish

Includes carsiding and trim to be painted as follows.

- a. 1 coat sanding sealer.
- b. 2 coats clear finish (alkyd-natural/stain, satin).
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SECTION 09915

COLOR SCHEDULE

06/02

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PART 3 EXECUTION (Not Applicable)

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SECTION 09915

COLOR SCHEDULE 06/02

PART 1 GENERAL

1.1 GENERAL

This section covers only the color of the exterior and interior materials and products that are exposed to view in the finished construction. The word "color" as used herein includes surface color and pattern. Requirements for quality and method of installation are covered in other appropriate sections of the specifications. Specific locations where the various materials are required are shown on the drawings. Items not designated for color in this section may be specified in other sections. When color is not designated for items, the Contractor shall propose a color for approval.

1.2 SUBMITTALS

Government approval is required for submittals with "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-14 Samples

Color Schedule; FIO

Two sets of color boards, 30 days after the Contractor is given notice to proceed, complying with the following requirements:

- 1) Color boards shall reflect all actual finish textures, patterns, and colors required for this contract.
- 2) Materials shall be labeled with the finish type, manufacturer's name, pattern, and color reference.
- 3) Samples shall be on size A4 or 8-1/2 by 11 inch boards with a maximum spread of size A1 or 25-1/2 by 33 inches for foldouts.
- 4) Samples for this color board are required in addition to samples required of other specification sections.

PART 2 PRODUCTS

2.1 REFERENCE TO MANUFACTURER'S COLOR

Where color is shown as being specific to one manufacturer, an equivalent

color by another manufacturer may be submitted for approval. Manufacturers and materials specified are not intended to limit the selection of equal colors from other manufacturers.

2.2 COLOR SCHEDULE

Colors, patterns and textures required for exterior and interior finishes, including both factory applied and field applied colors shall be selected by the Contracting Officer from manufacturer's standard colors, unless otherwise noted. See individual technical specification sections for additional information.

2.2.1 Exterior Walls

Exterior wall colors shall apply to exterior wall surfaces including recesses at entrances and projecting vestibules. Conduit shall be painted to closely match the adjacent surface color.

2.2.2 Exterior Roof

Roof color shall apply to exterior roof surfaces including sheet metal flashings and copings, mechanical units, roof trim, pipes, conduits, electrical appurtenances, and similar items.

2.2.3 Interior Wall Finishes

Interior wall color shall apply to the entire wall surface, including reveals, vertical furred spaces, grilles, diffusers, electrical and access panels, and piping and conduit adjacent to wall surfaces unless otherwise specified. Items not specified in other paragraphs shall be painted to match adjacent wall surface.

2.2.4 Interior Ceiling Finishes

Ceiling colors shall apply to ceiling surfaces including soffits, furred down areas, grilles, diffusers, registers, and access panels.

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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DIVISION 10 - SPECIALTIES

SECTION 10170

PLASTIC TOILET COMPARTMENTS

06/02

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SECTION 10170

PLASTIC TOILET COMPARTMENTS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 666

(1996b) Annealed or Cold-Worked Austenitic Stainless Steel, Sheet, Strip, Plate and Flat Bar

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Product Data; GA.

Submit detailed material and fabrication specifications and installation instructions. Include catalog cuts of hardware, anchors, fastenings and other data as required.

SD-14 Samples

Color Selections; GA.

Submit samples of manufacturer's standard colors for selection.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Subject to compliance with the specified requirements, provide plastic toilet compartments by Accurate Partitions Corp., Comtec Industries, General Partitions Manufacturing Corp., Santana Products Company, or approved equal

2.2 TOILET COMPARTMENTS

2.2.1 Style

Floor-mounted, overhead-braced.

2.2.2 Panels, Doors, and Pilasters

High-density polyethylene (HDPE) with homogenous color throughout. Provide material not less than 1 in. thick with seamless construction and eased edges in color selected by Contracting Officer from manufacturer's standard colors.

2.2.3 Pilaster Shoes and Sleeves (Caps)

ASTM A 666, Type 302 or 304 stainless steel, not less than 0.312 in. thick and 3 in. high, finished to match hardware.

2.2.4 Stirrup Brackets

Manufacturer's standard ear or U-brackets for attaching panels and screens to walls and pilasters of clear anodized aluminum or stainless steel.

2.2.5 Full-Height (Continuous) Brackets

Manufacturer's standard design for attaching panels and screens to walls and pilasters of clear anodized aluminum or stainless steel.

2.2.6 Overhead Bracing

Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile in manufacturer's standard finish.

2.2.7 Heat-Sink Strip

Manufacturer's standard continuous, extruded-aluminum strip in manufacturer's standard finish.

2.2.8 Coat Hook and Bumper

Inside compartment on in-swinging doors and outside of door on out-swinging doors of handicap accessible compartments if door opens against an adjacent wall.

2.2.9 Hardware and Accessories

Manufacturer's standard design, heavy-duty operating hardware and accessories of clear anodized aluminum or stainless steel.

2.2.10 Anchorages and Fasteners

Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide hex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other

rust-resistant, protective-coated steel.

2.3 FABRICATION

2.3.1 Compartment System

Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.

2.3.2 Heat Sink Strips

Provide aluminum heat-sink strips at exposed bottom edges of HDPE units to prevent burning.

2.3.3 Pilasters

Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

2.3.4 Wall Hung Screens

Provide wall hung screens in sizes indicated of same construction and finish as compartment panels.

2.3.5 Door Size

Unless otherwise indicated, provide 24 in. wide in-swinging doors for standard toilet compartments and 36 in. wide out-swinging doors with a minimum 32 in. wide clear opening for compartments indicated to be handicapped accessible.

2.3.6 Doors

Provide the following for each door in compartment system:

2.3.6.1 Hinges

Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return to fully closed position.

2.3.6.2 Latch and Keeper

Recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at

compartments indicated to be handicapped accessible.

- 2.3.6.3 Coat HookManufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
- 2.3.6.4 Door BumperManufacturer's standard rubber-tipped bumpers at out-swinging doors.
- 2.3.6.5 Door PullManufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

PART 3 EXECUTION

3.1 INSPECTION

3.1.1 Examine Conditions

Examine substrates and conditions under which toilet compartments and related items are to be installed.

3.1.2 Notification of Detrimental Conditions

Notify of conditions detrimental to proper and timely completion of the work.

3.1.3 Correction of Unsatisfactory Conditions

Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

3.2.1 General

Install compartments rigid, straight, plumb and level, with the panels laid out as shown. Provide clearances of not more than 1/2 in. between pilasters and panels, and not more than 1 in. between panels and walls. Locate wall bracket so that holes for wall anchorages occur in masonry or tile joints. Secure panels to supporting walls with manufacturer's recommended anchoring devices in accordance with shop drawings and manufacturer's instructions. Secure floor supports to the floor with not less than two lead expansion shields and sheet metal screws.

3.2.2 Securing Pilasters

Secure pilasters to supporting floor with specified anchorage devices. Level, plumb, and tighten with leveling device. Set tops of doors parallel with overhead brace when doors are in the closed position.

3.2.3 Head Rail

Head rail shall extend across front of each toilet compartment and be

securely anchored in a stainless steel wall bracket where it meets wall. End toilet compartment shall have an additional head rail running length of last panel and anchored securely to back wall.

3.3 HARDWARE ADJUSTMENTS

Adjust and lubricate hardware for proper operation after installation.

3.4 PROTECTION AND CLEANING

Protect units during delivery, storage, and after erection so that there will be no indication of use or damage at the time of acceptance. Replace damaged work.

3.5 FINAL ADJUSTMENTS

Perform final adjustments to pilaster leveling devices, door hardware, and other operating parts prior to final inspection. Clean exposed surfaces of compartments, hardware, fittings and accessories, and touch up minor scratches and other finish imperfections using materials and methods recommended by compartment manufacturer.

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SECTION 10430

EXTERIOR SIGNAGE

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SECTION 10430

EXTERIOR SIGNAGE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (1980; R 1993) Designation System for Aluminum Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; Rev 1994) Safety Performance
Specifications and Methods of Test for
Safety Glazing Materials Used in Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 123/A 123M	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 570/A 570M	(1996) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 653/A 653M	(1997) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924/A 924M	(1997) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 26/B 26M	(1997) Aluminum-Alloy Sand Castings
ASTM B 62	(1993) Composition Bronze or Ounce Metal Castings
ASTM B 108	(1997) Aluminum-Alloy Permanent Mold Castings

ASTM B 209 (1996) Aluminum and Aluminum-Alloy Sheet and Plate ASTM B 209M (1995) Aluminum and Aluminum-Alloy Sheet and Plate (Metric) ASTM B 221 (1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes ASTM B 221M (1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) ASTM C 1036 (1991; R 1997) Flat Glass ASTM D 3841 (1992) Glass-Fiber-Reinforced Polyester Plastic Panels (1996a) Surface Burning Characteristics of ASTM E 84 Building Materials AMERICAN WELDING SOCIETY (AWS) AWS C1.1 (1966) Recommended Practices for Resistance Welding AWS D1.1 (1996) Structural Welding Code - Steel AWS D1.2 (1990) Structural Welding Code - Aluminum NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM) (1988) Metal Finishes Manual for NAAMM AMP 505 Architectural and Metal Products; Section: Applied Coatings NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) NFPA 70 (1996; Errata 96-4) National Electrical Code SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) SAE AMS 3611 (1994; Rev D) Plastic Sheet, Polycarbonate General Purpose MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) MMUTCD Minnesota Manual on Uniform Traffic

1.2 GENERAL

Control Devices

All exterior signage shall be provided by a single manufacturer. Exterior signage shall be of the design, detail, sizes, types, and message content shown on the drawings, shall conform to the requirements specified, and shall be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation.

1.3 CHARACTER PROPORTIONS AND HEIGHTS

Letters and numbers on indicated signs for handicapped-accessible buildings shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. Characters and numbers on indicated signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.4 Raised and Brailled Characters and Pictorial Symbol Signs (Pictograms)

Letters and numbers on indicated signs which designate permanent rooms and spaces in handicapped-accessible buildings shall be raised 1/32-inch upper case, sans serif or simple serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 inch in height, but no higher than 2 inches. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram shall be 6 inches minimum in height. Indicated accessible facilities shall use the international symbol of accessibility.

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Exterior Signs; GA.

Drawings showing elevations of each type of sign; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction. A schedule showing the location, each sign type, and message shall be included.

1.6 QUALIFICATIONS

Signs, plaques, and dimensional letters shall be the standard product of a manufacturer regularly engaged in the manufacture of the products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.7 DELIVERY AND STORAGE

Materials shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

1.8 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

PART 2 PRODUCTS

2.1 MODULAR EXTERIOR SIGNAGE SYSTEM

Exterior signage shall consist of a system of coordinated directional, identification, and regulatory type signs located where shown. Dimensions, details, materials, message content, and design of signage shall be as shown.

2.1.1 Traffic Signs

Traffic signs shown for roads and parking areas shall be in accordance with the MMUTCD designation shown.

2.1.2 Recreation Area Signs

Signs for recreation trailheads and trails shall be as shown and in accordance with the MMUTCD designation shown.

2.1.3 Posts

One-piece aluminum or galvanized steel posts shall be provided with minimum 0.125 inch wall thickness. Posts shall be designed to accept panel framing system described. The post shall be designed to permit attachment of panel framing system without exposed fasteners. Caps shall be provided for each post.

2.2 METAL PLAQUES

Design and location of plaques shall be as shown.

2.2.1 Cast Metal Plaques

2.2.1.1 Fabrication

Cast metal plaques shall have the logo, emblem and artwork cast in the base relief technique. Plaques shall be fabricated from bronze.

2.2.1.2 Size

Plaque size shall be as shown.

2.2.1.3 Border

Border shall be radius as shown

2.2.1.4 Background

Background texture shall be fine pebble.

2.2.1.5 Mounting

Mounting shall be concealed.

2.2.1.6 Finish

Finishes shall consist of bronze with dark finish oxidized background. Letters shall be satin polished and entire plaque sprayed with two coats of clear lacquer.

2.3 SHOP FABRICATION AND MANUFACTURE

2.3.1 Factory Workmanship

Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled shall be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Welding to or on structural steel shall be in accordance with AWS D1.1. Welding shall be continuous along the entire area of contact. Exposed welds shall be ground smooth. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical. Items specified to be galvanized shall be by hot-dip process after fabrication if practical. Galvanization shall be in accordance with ASTM A 123/A 123M and ASTM A 653/A 653M, as applicable. Other metallic coatings of steel sheet shall be in accordance with ASTM A 924/A 924M. Joints exposed to the weather shall be formed to exclude water. Drainage and weep holes shall be included as required to prevent condensation buildup.

2.3.2 Dissimilar Materials

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of asphalt varnish or a coat of zinc-molybdate primer to prevent galvanic or corrosive action.

2.4 COLOR, FINISH, AND CONTRAST

For buildings required to be handicapped-accessible, the characters and background of signs shall be eggshell, matte, or other non-glare finish. Characters and symbols shall contrast with their background - either light characters on a dark background or dark characters on a light background.

PART 3 EXECUTION

3.1 INSTALLATION

Signs, plaques, or dimensional letters shall be installed in accordance with approved manufacturer's instructions at locations shown on the

drawings. Signs shall be installed plumb and true at mounting heights indicated, and by method shown or specified. Signs mounted on other surfaces shall not be installed until finishes on such surfaces have been completed.

3.1.1 Anchorage

Anchorage and fastener materials shall be in accordance with approved manufacturer's instructions for the indicated substrate. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood.

3.1.2 Protection and Cleaning

The work shall be protected against damage during construction. Hardware and electrical equipment shall be adjusted for proper operation. Glass, frames, and other sign surfaces shall be cleaned in accordance with manufacturer's instructions. After signs are completed and inspected, the Contractor shall cover all project identification, directional, and other signs which may mislead the public. Covering shall be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Signs shall be cleaned, as required, at time of cover removal.

3.2 HARDWARE SETS

Products identified in this section by reference to a specific manufacturer and product name/number are identified for the purpose of establishing a standard of quality, type, and function. Products of other manufacturers may be submitted for those listed, provided the substitution is equal in quality, type, and function and meets the specified requirements.

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SECTION 10520

FIRE PROTECTION SPECIALTIES

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SECTION 10520

FIRE PROTECTION SPECIALTIES 06/02

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Product Data; GA.

Submit manufacturer's current product data including specifications, handling, storage and installation instructions, and maintenance recommendations.

1.2 QUALITY ASSURANCE

1.2.1 Qualifications

1.2.1.1 General

Provide fire protection specialties units made of components of standard construction furnished by one manufacturer as coordinated assemblies.

1.2.1.2 Manufacturer

Five years experience in the manufacture of fire protection specialties.

1.2.1.3 Personnel

For actual installation of fire protection specialties, use personnel skilled in work required, completely familiar with manufacturer's recommended methods of installation, thoroughly familiar with requirements of work.

1.2.2 Regulatory Requirements

1.2.2.1 UL Listing

Provide portable fire extinguishers which are UL listed and bear UL "Listing Mark" for type, rating and classification of extinguisher listed.

1.2.3 Field Samples

If requested, furnish sample of each type of fire protection specialties to the Contracting Officer for review prior to manufacture/installation. Contracting Officer will forward approved sample to the project site for installation.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Protection

Protect fire protection specialties from damage during shipment, storage and construction.

1.3.2 Delivery

Deliver materials to the job site in factory sealed containers bearing the manufacturer's name and brand.

1.3.3 Damaged Material

Replace damage material prior to acceptance at no additional cost to the Owner.

1.4 PROJECT CONDITIONS

Existing conditions: Inspect the project prior to installation. If conditions do not meet approval, notify the Contracting Officer's Representative. Proceeding without notification implies acceptance of conditions.

PART 2 PRODUCTS

2.1 MANUFACTURER

Standard of Quality: Design is based on products of J.L. Industries, Bloomington, MN.

2.2 OTHER ACCEPTABLE MANUFACTURERS

Subject to compliance with requirements, acceptable manufacturers and products are as follows.

- a. Amerex Corporation, Trussville, AL.
- b. Larsen Manufacturing Company, Minneapolis, MN.
- c. Manufacturer of equal approved products.

2.3 COMPONENTS

2.3.1 Fire Extinguishers

Fire Extinguishers: Fully charged and ready for use at final acceptance. Size, type indicated in schedule at end of this section.

2.3.2 Standard Wall Hanger Brackets

Size in accordance with fixture size where indicated by symbol on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Work of Other Trades

Prior to commencing work, carefully inspect and verify that work is complete to point where this installation may properly commence.

3.1.2 Verification of Conditions

Verify that fire protection specialties may be installed in accordance with original design, pertinent codes and regulations, and pertinent portions of referenced standards.

3.1.3 Discrepancies

Immediately notify Contracting Officer's Representative. Do not proceed with installation in areas of discrepancy until fully resolved. Commencement of installation signifies acceptance of surface conditions.

3.2 INSTALLATION

Install plumb, true, square in neat, rigid, substantial manner. After erection, clean surfaces. Adjust hardware, leave in good operating condition.

3.3 SCHEDULE

Drawing	Size &	Rating	General
Symbol	<u>Type</u>		Location
FE-1	10# AGBC Dry Chemical (bracket)	4A:60B:C UL	Pump House

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SECTION 10800

TOILET ACCESSORIES

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 - 2.2.8 Diaper Changing Station (CS)
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SECTION 10800

TOILET ACCESSORIES 06/02

PART 1 GENERAL

1.1 REFERENCES

Not Used.

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Finishes; GA. Accessory Items; GA.

Manufacturer's descriptive data and catalog cuts indicating materials of construction, fasteners proposed for use for each type of wall construction, mounting instructions, operation instructions, and cleaning instructions.

1.3 DELIVERY, STORAGE, AND HANDLING

Toilet accessories shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area protected from construction damage and vandalism.

1.4 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

Toilet accessories shall be provided where indicated in accordance with paragraph SCHEDULE. Each accessory item shall be complete with the necessary mounting plates and shall be of sturdy construction with corrosion resistant surface.

2.1.1 Anchors and Fasteners

Anchors and fasteners shall be capable of developing a restraining force commensurate with the strength of the accessory to be mounted and shall be suited for use with the supporting construction. Exposed fasteners shall be of tamperproof design and shall be finished to match the accessory.

2.1.2 Finishes

Except where noted otherwise, finishes on metal shall be provided as follows:

Metal Finish

Stainless steel No. 4 satin finish

Carbon steel, copper alloy, Chromium plated, bright and brass

2.2 ACCESSORY ITEMS

Accessory items shall conform to the requirements specified below.

2.2.1 Grab Bar (GB)

Grab bar shall be 18 gauge, 1-1/4 inches OD Type 304 stainless steel. Grab bar shall be form and length as indicated. Concealed mounting flange shall have mounting holes concealed. Grab bar shall have satin finish. Installed bars shall be capable of withstanding a 500 pound vertical load without coming loose from the fastenings and without obvious permanent deformation. Space between wall and grab bar shall be 1-1/2 inch.

2.2.2 Mirrors, Glass (M1)

2.2.2.1 Mirrors

1/4" thick, No. 1 (mirror glazing) quality, clean polished plate/float mirror glass electrolytically copper plated, guaranteed against silver spoilage for 15 years.

2.2.2.2 Backing

Backing shall be resilient, non-absorbent filler material, with not less than 22 ga. galvanized steel backing plate attached to frame with concealed screws, one-piece construction, full height and width of mirror frame. Corrugated cardboard or other moisture absorbent filler material is not acceptable.

2.2.2.3 Hanger

Construct metal backing with hanger slots for concealed "tamper-proof" mounting. Provide manufacturer's standard hanger to engage with backing for concealed installation.

2.2.2.4 Frames

Use one piece roll formed frames, not less than 22 ga., satin finish, type 304 stainless steel, with square corners heli-arc welded and ground smooth.

2.2.2.5 Mirrors without Shelf

Provide of size as designated, 30-inch height; Bobrick B-290 series.

2.2.3 Sanitary Napkin Disposer (SND)

Sanitary napkin disposal shall be constructed of Type 304 stainless steel with removable leak-proof receptacle for disposable liners. Fifty disposable liners of the type standard with the manufacturer shall be provided. Receptacle shall be retained in cabinet by tumbler lock. Disposer shall be provided with a door for inserting disposed napkins, and shall be surface mounted.

2.2.4 Soap Dispenser (SD)

Soap dispenser shall be surface mounted, liquid type consisting of a vertical Type 304 stainless steel tank with holding capacity of 40 fluid ounces with a corrosion-resistant all-purpose valve that dispenses liquid soaps, lotions, detergents and antiseptic soaps.

2.2.5 Robe Hook (RH)

Robe hook shall have concealed wall fastenings, and a pin integral with or permanently fastened to wall flange. Maximum projection shall be 4 inches. Design shall be consistent with design of other accessory items. Finish shall be bright polish.

2.2.6 Toilet Paper Holder (TP)

Surface mounted, double roll without controlled delivery.

2.2.7 Mop and Broom Holder (MH)

Satin finish stainless steel, with 3 anti-slip holders with spring loaded rubber cam, minimum length 20", maximum length 30".

2.2.8 Diaper Changing Station (CS)

Diaper changing station shall be surface mounted and shall be fabricated of high impact plastic with no sharp edges. Unit fold down platform shall be concave to the child's shape, equipped with nylon and velcro safety straps and engineered to withstand a minimum static load of 250 lb. Safety graphics shall be pictorial for universal use. Color shall be selected by the Contracting Officer from manufacturer's standard colors.

2.2.9 Electric Hand Dryer (EHD) at Restroom

Electric hand dryer shall be wall mounted and shall be designed to operate on 110/125 volts, 60 cycle, single phase alternating current with a heating element core rating of not more than 2100 watts. Dryer housing shall be of

single piece construction and shall be chrome plated steel.

PART 3 EXECUTION

3.1 INSTALLATION

Toilet accessories shall be securely fastened to the supporting construction in accordance with the manufacturer's approved instructions. Accessories shall be protected from damage from the time of installation until acceptance.

3.2 CLEANING

Material shall be cleaned in accordance with manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring of surfaces.

3.3 SCHEDULE

Refer to drawings for schedule.

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SECTION 14600

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SECTION 14600

ELECTRICAL OVERHEAD MONORAIL HOIST AND BEAMS 06/02

PART 1 GENERAL

1.1 SCOPE

The work under this section includes the furnishing, fabricating, installation, and testing of the electric overhead monorail system.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA)

AGMA 6010-E	(1988; Errata Nov 91) Standard for Spur, Helical, Herringbone and Bevel Enclosed Drives
AGMA 6019-E	(1989) Gearmotors Using Spur, Helical, Herringbone, Straight Bevel, or Spiral Bevel Gears
AGMA 6021-E	(1989) Shaft Mounted and Screw Conveyor Drives Using Spur, Helical and Herringbone Gears

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (ASIC)

ASIC S329	(1985) Allowable Stress Design			
	Specification for Structural Joints Using			
	ASTM A325 or ASTM A490 Bolts			

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 159	(1983; R 1993) Automotive Gray Iron Castings
ASTM A 325	(1996) Structural Bolts, Steel Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 490	(1997) Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum

	Tensile Strength			
ASTM A 668	(1996) Steel Forgings, Carbon and Alloy, for General Industrial Use			
ASTM B 438	(1995) Sintered Bronze Bearings (Oil-Impregnated)			
ASTM B 439	(1995) Iron-Base Sintered Bearings (Oil-Impregnated)			
ASTM B 612	(1996) Iron Bronze Sintered Bearings (Oil-Impregnated)			
ASTM B 633	(1985) Electrodeposited Coatings of Zinc on Iron and Steel			
AMERICAN SOCIETY OF MEC	HANICAL ENGINEERS (ASME)			
ASME B30.16	(1993) Overhead Hoist (Underhung)			
ASME B30.17	(1992) Overhead and Gantry Cranes Top Running Bridge, Single Girder, Underhung Hoist			
AMERICAN WELDING SOCIET	Y (AWS)			
AWS D1.1	(1996) Structural Welding Code-Steel			
AWS D14.1	(1985) Welding of Industrial and Mill Cranes and Other Material Handling Equipment			
CRANE MANUFACTURERS ASS	OCIATION OF AMERICA (CMAA).			
CMAA 74	(1987) Specification for Top Running and Under Running Single Girder Electric Overhead Traveling Cranes			
MONORAIL MANUFACTURER'S	ASSOCIATION (MMA)			
MMA	Specification for Underhung Cranes and Monorail Systems			
NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)				
NEMA ICS 2	(1993) Industrial Control and Systems Controllers, Contactors, and Overload Relays			
NEMA ICS 6	(1993) Enclosures for Industrial Controls and Systems			
NEMA MG 1	(1993) Motors and Generator Standards			

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1996) National Electrical Code

UNDERWRITER'S LABORATORIES, INC. (UL)

UL 489 (1991) Molded-Case Circuit Breakers and

Circuit Breaker Enclosures

UL 1004 (1994) UL Standard for Safety Electric

Motors

UL 1449 (1985/1986 Errata) Surge Suppressors,

Transient Voltage

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Design Calculations; GA.

Design calculations for the selection of the monorail support beams, and connections, and any and all other components of the crane system shall be submitted. Design calculations shall be stamped by a Registered Professional Engineer.

Spare Parts Data; GA.

After approval of the shop drawings and not later than one month prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for the hoist. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

SD-04 Drawings

Shop Drawings; GA.

Shop drawings shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical literature; performance charts and curves; catalog cuts; and installation instructions. Shop drawings shall also contain wiring and schematic diagrams, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances. Drawings shall show equipment relationship to other parts of the work, including the pump stations. Clearances for maintenance and operation shall be shown. Shop drawings shall consist of the following:

- a. Complete list of equipment and materials, including manufacturer's descriptive and technical literature; performance charts and curves; catalog cuts; and installation instructions.
- b. Complete wiring and schematic diagrams, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit.
- c. Proposed layout and anchorage of equipment and appurtenances.
- d. Equipment relationship to other parts of the work, including the pump station building. Clearances for maintenance and operation shall be shown.

Specific shop drawings shall include the following:

- a. Layout drawing of the monorail crane girder and support beam members.
- b. Wire Rope hoist. Include dimensional data, performance data, and load rating criteria. Include wiring drawings, electric schematics, and electrical installation details.
- c. Cable Reel. The cable reel and pivot support shall be submitted with plan and elevation shown in layout drawing, described in (a.) above, with the cable reel limits of travel, vertical and horizontal tracking and required structural base to achieve operation in one horizontal plane.

SD-09 Reports

Performance Test Reports; GA.

Upon completion and testing of the installed system, test reports shall be submitted in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria. The report shall include the information as required by paragraph: ACCEPTANCE TESTING.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Instructions; GA.

Furnish eight copies of complete operating instructions outlining the step-by-step procedures required for system startup, operation, and shutdown. The instructions shall include the manufacturer's name, model number, service manual, part lists, and brief description of all equipment and their basic operating features. Operating instructions shall include all approved shop drawings. Final performance test reports shall be included.

Furnish eight copies of complete maintenance instructions listing routine maintenance procedures, possible breakdowns, repairs, and a trouble-shooting guide. The instructions shall include equipment layout, simplified wiring, and control diagrams for the system as installed.

Framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, shall be posted where directed. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal, safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above for the wiring and control diagrams, and posted beside the diagrams. Proposed diagrams, instructions, and other sheets shall be submitted prior to posting. The framed instructions shall be posted before acceptance testing of the systems.

PART 2 PRODUCTS

2.1 GENERAL

2.1.1 Single Responsibility and Standard Products

All work furnished under this section shall be provided by a single supplier who shall take the complete responsibility for the complete package furnished. Materials and equipment shall be standard products of manufacturers regularly engaged in the fabrication of hoists and monorails and shall essentially duplicate items that have been in satisfactory use for at least two years prior to bid opening. Monorail hoist to be supplied shall be designed and manufactured by a company with a minimum of 10 years of specialized experience in this particular field.

2.1.2 Nameplates

Each major component of equipment shall have the manufacturer's name, address, type or style, model or catalog number, and serial number on a plate secured to the equipment.

2.1.3 Verification of Dimensions

The Contractor shall verify all dimensions in the field by measurement and shall advise the Contracting Officer of any discrepancy with contract documents before performing any work.

2.1.4 Welding

Welding shall be in accordance with qualified procedures using AWS D14.1 and D1.1, as modified herein. All welding shall be performed indoors, and the surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Minimum preheat and interpass temperatures shall conform to the requirements of AWS D1.1. Welding shall be performed in accordance with written procedures that specify the Contractor's standard dimensional tolerances for deviation from camber and sweep. Such tolerances shall not exceed those specified in accordance with AWS D1.1. Allowable stress ranges shall be in accordance with MMA specification. Welding of beam shall conform with AWS D1.1. Welders, welding operators, and welding procedures shall be qualified or prequalified in accordance with AWS D1.1, in lieu of AWS D14.1.

2.1.5 Manufacturer's Services

Services of a manufacturer's representative who is experienced in the installation, adjustment, erection, and operation of the equipment specified shall be provided. The representative shall supervise the installation, adjustment, and testing of the equipment.

2.1.6 Delivery and Storage

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

2.1.7 Design Criteria

The hoist and trolley shall be designed to operate in the space indicated. The hook vertical travel shall not be less than 8 inches above the station sump floor. The hoist and trolley shall be designed and constructed for moderate service requirements for operation in nonhazardous environment. The hoist shall be 3 ton capacity. Monorail hoist shall be underhung on the monorail beam system. Monorail beam shall be underhung and attached and installed to the support beams as shown on the drawings. The trolley shall be low headroom type and shall be electrically operated motor drive type.

2.1.7.1 Beams

Monorail beam and support members are indicated on the drawings. The crane manufacturer shall design all components of the monorail including the curved monorail beams and support connections to perform with the other hoist support components. The hoist manufacturer shall establish the final size for the monorail beam. Monorail beam shall be underhung from the support beams.

The support beams and connections shall be fabricated from structural steel in accordance with the requirements for structural steel found in SECTION 05500: MISCELLANEOUS METALS, except that the structural steel shall be painted in accordance with these specification instead of galvanized.

2.1.7.2 Rated Capacity and Speeds

The rated capacity of the hoist and trolley shall be 3 tons. The lower load block and hook shall not be considered part of the rated capacity. Rated speed (in feet per minute, fpm) for the hoist shall be as follows.

Rated Sp	eeds (fpm)	
	Maximum	Minimum
Hoist (2 Speed)	15	4
Trolley (2 Speed)	80	20

2.1.7.3 Capacity Plate

Two capacity plates shall be provided, one for each side of the hoist. Each plate shall be lettered to indicate the total rated hoisting capacity. All lettering shall be of sufficient size to be easily read from the floor.

The lower load block shall be marked with the hoist-rated capacity.

2.2 MATERIALS

2.2.1 Structural Materials

2.2.1.1 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall conform to ASTM A 325 bolts. High-strength bolted connections shall conform to the requirements of the ASIC Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts, except that ASTM A 490 bolts shall not be used. No galvanized bolts shall be used.

2.2.1.2 Hoist Trolley Frame

Trolley frame shall consist of two structural steel side frames or trucks welded together with one or more structural steel load girts to form a one-piece unit. Pads shall be provided for the use of jacks or wedges when changing truck wheels. Trolley shall be geared, motor driven. Trolley wheels shall ride on sealed roller bearings, and capable of operating on a 5 foot radius.

2.2.1.3 Stops and Bumpers

Structural trolley stops shall be provided on the beam to engage the trolley wheels. Stops shall be located to permit maximum trolley travel.

2.3 HOIST AND TROLLEY

2.3.1 General

Hoist shall be heavy duty, electric, wire rope type. Hoist and trolley shall be furnished by the same supplier. Hoist shall be completely factory assembled. Hoist and trolley shall be rated at 3 tons capacity. Trolley for the hoist shall be motor driven. Monorail beam shall be underhung, from the support beams.

2.3.2 Hoist Load Block

Load block shall be of steel construction. Load block shall be provided with swivel mounting for the hook. Sheave bearing lubrication fittings shall be recessed within the sheave pin or adequately guarded to prevent damage.

2.3.3 Hook Assembly

Hook shall be single barbed and shall be made of forged steel complying with ASTM A 668. Hooks shall be fitted with safety latch designed to preclude inadvertent displacement of slings from the hook saddle. No painting or welding shall be performed on the hook. Hook material and any heat treatment performed shall be stamped on the hook shank or documented in certification papers furnished with the hook. Hook shall be commercially rated and shall have a minimum proof load of twice the safe working load

and a minimum straightening load of four times the safe working load.

2.3.4 Hoisting Ropes

Hoisting ropes shall be regular lay, preformed, uncoated, improved plow steel, 6 by 37 construction, with independent wire rope core. Wire rope shall be designed for hoisting service. The hoisting ropes shall be selected such that the rated capacity load, plus the load block weight, divided by the number of parts of rope, shall not exceed 20 percent of the certified breaking strength of the rope. Hoisting ropes shall be secured to the hoist drum so that no less than two wraps of rope remain at each anchorage of the hoist drum at the extreme low position (limit switch stop).

2.3.5 Sheaves

Sheaves shall be of cast steel, forged, rolled, or welded structural steel. Sheave grooves shall be accurately machined, smoothly finished, and free of surface defects.

2.3.6 Hoist Drum

Hoist drum shall be of welded rolled structural steel, cast steel, or seamless steel pipe. Drum shall be machined and provided with right- and left-hand grooves, including two dead grooves at each of the two anchor points, as may be applicable.

2.3.7 Gearing

Gearing shall be of the enclosed type and shall be an integral part of the hoist. The gears and pinions shall be spur, helical, or herring-bone type only and shall be forged, cast, or rolled steel, except that drum gears may be of welded construction.

2.3.8 Gear Reducers

Gear reducers shall be an integral part of the hoist. Gear reducers shall be designed, manufactured, and rated in accordance with AGMA 6010-E, AGMA 6019-E, or AGMA 6021-E (for trolley drives only), as applicable.

2.3.9 Brakes.

Brakes shall be of the shoe or disk type with thermal capacity suitable for Class C service. Shoe and disk brakes shall be spring set and electrically released by a continuously rated, direct- acting magnet. All brakes shall be self-aligning and provide for easy adjustment for torque setting and lining wear. Brake wheels shall be cast iron conforming to ASTM A 159 or shall be the manufacturer's standard high-strength ductile cast iron, provided that the material exhibits wear characteristics in the form of powdered wear particles and is resistant to heat checking. Disk brakes shall be totally enclosed and have multiple disks with stationary releasing magnets. Brake torque shall be easily adjustable over a 2:1 torque range

2.3.9.1 Hoist Holding Brakes

The hoist shall be equipped with at least one holding brake. The holding brake shall be a friction brake of the shoe design and shall be applied to the motor shaft or to the gear reducer shaft.

2.3.9.2 Hoist Control Brake

Hoist shall be equipped with an integral mechanical load brake of the "Weston" type or multiple-disk type. The multiple disk type brake shall be provided with external adjustment for wear.

2.3.10 Bearings

All bearings, except those subject only to small rocker motion, shall be of the antifriction type. Equalizer sheaves shall be equipped with sintered oil-impregnated type bushings in accordance with ASTM B 438, ASTM B 439, or ASTM B 612.

2.3.11 Antidrip Provisions

The hoist and trolley shall be designed to preclude leakage of lubricants onto the lifted loads or the floor. Equipment and components that cannot be made leakproof shall be fitted with suitable drip pans. The drip pans shall be made of steel and shall be designed to permit removal of the collected lubricant.

2.3.12 Lubrication System

Splash type oil lubrication system shall be provided for the hoist and trolley gear cases. Oil pumps shall be of the reversible type capable of maintaining the same oil flow direction and volume while being driven in either direction. Electric motor-driven pumps may be used when the input shaft speed is too low at any operating condition to ensure adequate oil flow. In such applications, the pump shall be energized whenever the drive mechanism brakes are released.

2.3.13 Electrical Components

Controls, starters, and disconnects shall be furnished with the hoist. Controls shall be integral with the hoist and include heavy duty reversing contactors and low voltage transformer.

2.3.13.1 Hoist Control System.

A four push-button station shall be furnished for the hoist

2.3.13.2 Power Sources

Hoist shall be designed to operate from a 480 volt, three-phase, three-wire, 60 hertz power source.

2.3.13.3 Transformers

Transformers shall be dry-type and shall carry full load continuously at

rated voltage and frequency without exceeding an average temperature rise of 115 degrees C above an ambient temperature of 40 degrees C. The transformer shall have a totally enclosed case, which shall be finished to resist corrosion. Transformers shall be fully encapsulated, except for those specifically designed for use as an isolation transformer for static power conversion units.

2.3.13.4 Motors

Motors shall be designed specifically for crane and hoist duty. Drain holes shall be provided at low points near each end. Inspection and service covers shall be provided with gaskets. All hardware shall be corrosion-resistant. Motors shall conform to the requirements of NFPA 70, NEMA MG 1, and UL 1004.

2.3.13.5 Hoist Motor

The hoist motor shall be industrial-type, two-speed, 4 horsepower rating. If the supplier elects to provide a larger motor, the Contractor shall be responsible for increasing power source wiring, as may be required, at no additional cost to the Government. The hoist motors shall be provided with Class B insulation, with a 30-minute minimum motor time rating to satisfy NEMA permissible motor temperature rise above 40 C ambient.

2.3.13.6 Control System

Controllers shall be provided for the motors. Overload protection shall be in conformance with the requirements of NEMA ICS 2. Contacts used for starting, stopping, and reversing shall be mechanically and electrically interlocked.

2.3.13.7 Control Panel

Control panel shall be fabricated of solid sheet steel designed and constructed to conform to the requirements of NEMA ICS 6, Type 12. Control panel doors shall be hinged, equipped with gaskets, and fitted with key-lock handles designed to latch the door at top, center, and bottom. A single key shall open all locks. The control panel shall be mounted on the hoist and shall contain all starters, transformers, and circuit protection. Disconnect shall be furnished with the hoist for installation by the electrical sub-contractor.

2.3.13.8 Hoist Control

The hoist motor control system shall provide one speed in each direction by means of an electrically operated, full-magnetic, across-the-line, reversing-type starter, NEMA Size 1 minimum.

2.3.13.9 Pendent Control Station

The pendent control station shall be suspended from the hoist by a strain chain or 1/4 inch (minimum) wire rope strain lead of corrosion-resistant steel. The pendent control station enclosure shall be NEMA Type 4/12.

Push buttons shall be heavy-duty, dust-tight and oil-tight type having distinctly felt operating positions. Push buttons shall be constructed so that they cannot become hung-up in the control case. Pendent shall include a separate set of push buttons for each motion and for POWER, ON-POWER, OFF. Pendant shall reach within 4 feet of the operating floor.

a. Push buttons shall be as follows:

Hoist Up Trolley - Forward
Hoist Down Trolley - Reverse
POWER OFF Power - Off
POWER ON Power - On

b. The POWER OFF push button shall have a bright red mushroom head.

2.3.13.10 Surge Protection

Three metal oxide varistors shall be provided on the line-side of each transformer to provide transient overvoltage protection. Surge suppressors shall meet the requirements of UL 1449.

2.3.13.11 Overloads

AC circuit overload relays shall be of the ambient-compensated, automatic-reset, inverse-time type located in each phases of the mainline and individual motor circuits and arranged to open the mainline contact.

2.3.13.12 Limit Switches

Limit switches shall be heavy-duty, quick-break, double-pole, double-throw type and shall conform to NEMA ICS 2. Geared limit switch interruption of a motion in one direction shall not prevent the opposite motion. Geared limit switches shall reset automatically. Limit switch housings shall be NEMA Type 12 or 13. Limit switches shall interrupt power to the primary control systems.

2.3.13.13 Hoist Upper Limit Switches

Two limit switches shall be provided for the hoist. A rotating-type, adjustable, geared-control, circuit-interrupt limit switch shall provide hoist-up limiting. A secondary hoist upper limit shall be provided with a weight-operated limit switch to prevent raising beyond their safe limit. This secondary limit switch shall operate to interrupt power to all hoist motor conductors and set the hoist holding brakes.

2.3.13.14 Hoist Lower Limit Switches

Hoists shall be provided with a rotating-type, adjustable, geared-control, circuit-interrupt limit switch for hoist-down travel limiting.

2.3.13.15 Wiring

All wire runs shall be numbered or tagged at connection points. All splices

shall be made in boxes or panels at terminals. Motor loop and branch circuit and brake conductor selection shall be based on the continuous duty rating of NFPA 70 for 60 C conductors, and all other conductors shall be selected based on their 60-minute, short-time rating. Insulation for wiring shall be 600-volt, Type MTW. Conductors in the vicinity of, or connected to, resistors shall be Type TFE. All control wiring shall be 16 AWG or larger. All power wiring shall be 12 AWG or larger.

2.4 CABLE REEL

The Contractor shall furnish a cable reel for supplying power to each monorail hoist. At each pump station, the cable reel shall be located and mounted to the support member spanning the station width from the rear station wall between the first and second pump bay and terminating near the passage door. The beam shall have a spacer of light gage structural steel to align the cable reel guide arm centerline with the monorail hoist horizontal centerline.

2.4.1 Swivel Base

The cable reel shall be mounted on a swivel base capable of 340 degrees of rotation and utilizing sealed ball bearings for smoothness of rotation. The pivot base shall be similar or equal to Insul 8 Model #PVB as manufacturer by Insul 8, Omaha, Nebraska.

2.4.2 Electrical Cable

The reel shall be furnished with 25 feet of electrical type SO cable that supplies power to control panel on the monorail hoist. The cable shall be flexible and suitable in a temperature range from 20 degrees F. to 100 degrees F. The wire size shall be sufficiently large to provide for all hoist and trolley current loads without excessive voltage drop. The connection at the monorail control panel shall allow full travel of the monorail hoist through 340 degrees action of the swivel base. The cable reel shall have positive take-up of slack cable and release of cable using ratchets and springs to control movement. The cable reel shall utilize a slip ring assembly in a NEMA 4X enclosure. A guide arm will control cable direction within 15 degrees and have cable rollers for non-chafing take-up and release of the cable. The return spring shall have sufficient tension to prevent cable droop between the reel and monorail hoist. The stand and reel shall be formed steel construction. Cable reel shall be similar or equal to 1400 Series of Insul 8 Powereel as manufactured by Insul 8 Omaha, Nebraska.

PART 3 EXECUTION

3.1 ERECTION

3.1.1 General

Erection of the monorail hoist and support girders shall be in accordance with the manufacturer's instructions and as indicated. Major components of

the hoist and trolley shall be shop assembled as completely as possible. After complete shop testing, disassembled parts shall be match-marked and electrical connections shall be tagged. All parts and equipment at the site shall be protected from weather, damage, abuse, and loss of identification. The erection procedures shall ensure that the hoist and trolley are erected without initial stresses, forced or improvised fits, misalignments, nicks of high- strength structural steel components, stress-raising welds, and rough burrs. After the hoist and trolley are erected, any damaged painted surfaces shall be cleaned and repainted. All couplings, brakes, gearboxes, and drive components shall be aligned when reinstalled, in accordance with manufacturer's instructions.

3.1.2 Installation of Girders

Support girders and beams shall be straight and true. When loaded, the deflection of hoist beam shall not exceed 1/800 of the span. Monorail joints shall be flush and true without misalignment of running tread and shall be designed to minimize vibration. The monorail beam shall be leveled to a plus-or-minus 3 mm (1/8 inch) at all rail support joints. Rail joints shall be bolted using standard joint bars. A positive stop shall be provided at monorail beam ends.

3.1.3 Painting

Monorail beam, support beams and connections, and all other components of the monorail hoist, shall be painted. Contractor shall submit paint system for approval. As a minimum, 2 primer coats and 2 finish coats shall be applied. Finish coat shall be enamel or epoxy. Monorail hoist and trolley shall be painted per the manufacturer's standard finish. Items such as surfaces in contact with the rail wheels, wheel tread, hooks, and wire rope and nameplates shall not be painted.

3.1.4 Electrical Installation.

The electrical system shall be installed in accordance with manufacturer's instructions. All controls, starters, and disconnects shall be furnished with the hoist. Alignment data shall include timer settings, resistor tap settings, potentiometer settings, test point voltages, supply voltages, motor voltages, motor currents, and test conditions, such as ambient temperature, motor load, date performed, and person performing the alignment. A copy of the final alignment data shall be stored in the control panel door. Electrical hookup shall be in accordance with SECTION: ELECTRICAL WORK.

3.2 ACCEPTANCE TESTING

3.2.1 Monorail hoist and Acceptance Test

The Contractor shall provide all personnel and equipment necessary to conduct the tests, including, but not limited to, hoist operators, riggers, rigging gear, and test weights. Testing shall be performed in the presence of Contracting Officer. The Contractor shall notify the Contracting Officer 15 days prior to testing operations.

3.2.2 Test Sequence

The hoist shall be tested according to the applicable paragraphs of this procedure in the sequence provided.

3.2.3 Test Data

Hoist test data shall be recorded on appropriate test record forms suitable for retention for the life of the hoist. Operating and startup current measurements shall be recorded for electrical equipment (motors and coils) using appropriate instrumentation. Speed measurements shall be recorded as required by the facility evaluation tests (normally at 100 percent load). Recorded values shall be compared with design specifications or manufacturer's recommended values; abnormal differences shall be justified in the remarks or appropriate adjustments performed. In addition, high temperatures or abnormal operation of any equipment or machinery shall be noted, investigated, and corrected. Hoist speeds should be recorded during each test cycle.

3.2.4 Equipment Monitoring

During the load test, improper operation or poor condition of safety devices, electrical components, mechanical equipment, and structural assemblies shall be monitored. Observed defects critical to continued testing shall be reported immediately to the Contracting Officer, and testing shall be suspended until the deficiency is corrected. During and immediately following each load test, the following inspections shall be made:

- a. Inspect for evidence of bending, warping, permanent deformation, cracking, or malfunction of structural components.
- b. Inspect for evidence of slippage in wire rope sockets and fittings.
- c. Check for overheating in brake operation; check for proper stopping. All safety devices, including emergency stop switches and POWER OFF push buttons, shall be tested and inspected separately to verify proper operation of the brakes.
- d. Check for abnormal noise or vibration and overheating in machinery drive components.
- e. Check wire rope sheaves and drum spooling for proper operation, freedom of movement, abnormal noise, or vibration.
- f. Check electrical drive components for proper operation, freedom from chatter, noise, or overheating.
- g. Inspect external gears for abnormal wear patterns, damage, or inadequate lubrication.

3.2.5 Hooks

Hooks shall be measured for hook throat spread before and after load test. A throat dimension base measurement shall be established by installing two tram points and measuring the distance between these tram points (to within 1/64 inch). This base dimension shall be recorded. The distance between tram points shall be measured before and after load test. An increase in the throat opening by more than 1 percent from the base measurement shall be cause for rejection.

3.2.6 No-Load Testing

3.2.6.1 Hoist and Limit Switch Test

The load hook shall be raised and lowered through the full range of normal travel at rated speed. The load hook shall be stopped below the geared limit switch upper setting. Proper operation of upper and lower limit switches for primary motions shall be verified. The test shall be repeated a sufficient number of times (minimum of three) to demonstrate proper operation. Brake action shall be tested in each direction. The proper time delay shall be verified between the actuation of the dual brakes.

3.2.6.2 Trolley Travel

The monorail trolley shall be a operated the full distance of the monorail beams including operating over the curved sections. The trolley bumpers shall contact the trolley stops located on the monorail beams. The hoist trolley shall be operated across the full length of the monorail beam.

3.2.6.3 Hoist Loss of Power No-Load Test

Using primary drive, the hook shall be raised to a height of approximately 8 feet. While lowering the hook, the main power source shall be disconnected verifying that the hook will not lower and that both brakes will set.

3.2.7 Load Test

Unless otherwise indicated, the following tests shall be performed using a test load of 125 percent (plus 5 percent, minus 0 percent) of rated load

3.2.7.1 Hoist Static Load Test

Holding brakes and hoisting components shall be tested by raising the test load approximately 1 foot and manually releasing one of the holding brakes. The load shall be held for 10 minutes. The first holding brake shall be reapplied, and the second holding brake shall be released. The load shall be held for 10 minutes. Any lowering that may occur indicates a malfunction of the brakes or lowering components.

3.2.7.2 Dynamic Load Test

The test load shall be raised and lowered through the full range. The machinery shall be completely stopped at least once in each direction to ensure proper brake operation.

3.2.7.3 Hoist Load Brake

With test load raised approximately 5 feet and with the hoist controller in the neutral position, the holding brake shall be released. The load brake shall be capable of holding the test load. With the holding brake in the released position, the test load shall be lowered (first point) and the controller shall be returned to OFF position as the test load lowers. The load brake shall prevent the test load from accelerating.

3.2.7.4 Hoist Loss of Power Test

After raising the test load to approximately 8 feet and slowly lowering the test load, the main power source and the control push button shall be released verifying that the test load will not lower and that both brakes will set.

3.2.7.5 Beam Dynamic Load Test

Operate the hoist trolley the full distance of the monorail beam in each direction with test load on the hook (one cycle). Confirm that no permanent deflections have occurred and no fasteners have loosened. Operate the monorail hoist the full distance along the monorail beams with test load on the hook.

3.2.8 Pump Lifting Test

After successful completion of the load test using test weights, the hoist shall be used to lift the pumps out of the wetwell. The lifting of both pumps shall be demonstrated. Pumps shall be lifted completely out of the wet well and set on the floor of the pump station.

3.3 FIELD TRAINING

A field training course shall be provided for designated operating staff members. Training shall be provided for a total period of two hours of normal working time and shall start after the system is functionally complete, but prior to final acceptance tests. Field training shall cover all the items contained in the operating and maintenance instructions.

-- End of Section --

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SECTION 15050

SLUICE GATES

06/02

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SECTION 15050

SLUICE GATES 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M 29	(1988) American Association of State Highway and Transportation Officials (AASHTO)			
AASHTO M 82	(1975, Rev 1993) Cut-Back Asphalt (Medium Curing Type)			

American Society for Testing and Materials (ASTM)

ASTM A 36	(1994) Structural Steel
ASTM A 108	(1993) Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 126	(1993) Gray-Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 148	(1993) Steel Castings, High-Strength, for Structural Purposes
ASTM A 194	(1994) Carbon and Alloy Steel Nuts for Bolts for High Pressure and High-Temperature Service.
ASTM A 276	(1994) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 320	(1994) Alloy-Steel Bolting Materials for Low-Temperature Service
ASTM A 582	(1993) Free-Matching Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished

ASTM B 21	(1990) Naval Brass Rod, Bar and Shapes
ASTM B 98	(1993) Copper-Silicon Alloy Rod, Bar and Shapes
ASTM B 584	(1993) Copper Alloy Sand Castings for General Applications
ASTM C 33	(1997) Specification for Concrete Aggregates
ASTM D 2000	(1990) Rubber Products in Automotive Applications

American Water Works Association (AWWA)

AWWA C 501 (1992) Standard for Sluice Gates

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Design Data; GA.

Design computations and technical data showing factors of safety, calculations of stresses, and other information necessary to assure compliance with the drawings and specifications shall be submitted to the Contracting Officer.

Hoist Design Criteria: The Contractor shall submit calculations which clearly show how the size of the operator was chosen. For the sluice gate lifts, a friction factor of 0.6 shall be used, and the gate size and the heads shall be those specified elsewhere in this section.

SD-01 Data

Gate Vendor Information; FIO

Gate Vendor's Erecting Engineer: Gate vendor information as specified in PARAGRAPH: Gate Vendor's Erecting Engineer, of this section shall be submitted.

SD-04 Drawings

Shop Drawings; GA.

Shop drawings shall be submitted for sluice gates showing details for mounting, materials, construction and installation procedures. Catalog data, including specifications and full descriptive data, shall be

submitted for all materials and equipment furnished. Shop drawings on the portable operator to include catalogue and performance data. Top mounting wall bracket for gravity closure gate installation and support shop drawings shall be submitted.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Manuals; GA.

The Contractor shall submit, prior to delivery of gates to the project work site, five copies of a manual containing complete information in connection with the operation, lubrication, adjustment, routine and special maintenance, disassembly, repair, and reassembly of the gates and accessories. Each set shall be permanently bound and shall have on the cover the following: (1) The words, "OPERATING AND MAINTENANCE INSTRUCTIONS", (2) the name and location of the project, (3) the Contractor's name, and (4) the contract number. Flysheets shall be placed before instructions covering the subject. The sheets shall be approximately 8-1/2 x 11" which large sheets of drawings folded in. Each set shall include, but not be limited to, the following:

- a. Operating and maintenance instructions for each piece of equipment including lubrication instructions.
- b. Manufacturer's bulletins, cuts, and descriptive data
- c. Parts lists and recommended spare parts.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Sluice gates shall be the standard product of a reputable manufacturer having had at least 5 years of successful experience in the design and manufacture of such items. Gates and accessories shall be of the following design:

- a. Sluice gates shall be rising stem.
- b. Gates shall be either flush bottom type or wall mounted as indicated on the drawings.
- c. Sluice gate frames shall be flange back type.
- d. Thimbles shall be sufficiently rigid to preclude distortion during installation.

2.1.1 General Design

Component parts shall be designed for the seating and unseating heads shown in TABLE 1 in this section using a minimum factor of safety of 5, to be increased as desired and be sized and guided so that, unless otherwise shown on the drawings, the slenderness ratio (L/R) shall not exceed 200. The opening and closing forces for design of the stem and stem block

anchorage shall include friction load based on the operating pressure shown in TABLE 1, with coefficient of friction of not less than 0.6 for sluice gates in addition to the weight of the gate and stem. Stem design shall include a factor of safety of 5 against failure in addition to the column buckling strength reduction effects as given by the Euler formula.

TABLE 1. GATE REQUIREMENTS

Gate Location	Gate Size (Inches)		Face Design Pressure	Back Design Pressure
			(Feet of Head)	(Feet of Head)
K14 Inlet	42×42	1	7	5
K14 Gravity Flow	66 x 66	3	30	25
K-14 Gated Manhole	36 x 36	1	10	5

2.2 MATERIALS

Materials shall meet the requirements of the following referenced publications. Use of other grades or alloys shall be requested in writing and will be subject to approval.

- a. Structural steel: ASTM A 36.
- b. Naval brass: ASTM B 21, copper alloy No. 464 or 482; temper, optional.
 - 1. Iron castings: ASTM A 126.
 - 2. Steel casting: ASTM A 148.
- c. Manganese bronze: ASTM B 584, high-strength yellow brass, copper alloy No. 932.
- d. Cold-rolled steel: ASTM A 108, Grades 1010 through 1020.
- e. Stainless steel:
- 1. ASTM A 276, Type 304, Condition A (annealed) or B (cold worked, high tensile), type of finish optional.
- 2. ASTM A 582, Type 303, Condition A (annealed), type of finish optional.
- f. Bolting materials:
 - 1. Bolts: ASTM A 582, Type 303 or 416.
 - 2. Nuts: ASTM B 98, alloy 655.

- g. Asphalt liquid: AASHTO M 82, medium-core, liquid-asphalt type, Grade MC-30 or MC-70.
- h. Sand: AASHTO M 29.
- i. Seals: ASTM D 2000, Grade 4AA 625A13.

2.3 SLUICE GATES

2.3.1 General

Gates shall be heavy-duty type as manufactured by Rodney Hunt, Hydro Gate, Waterman, or approved equal. Stainless steel gates similar to Fontaine Series 20 or Whipps Model 950 Series or equal are acceptable for the pump station inlet gates described in TABLE 1. Stainless steel gates shall meet the same applicable AWWA standards as the cast iron gates and all other requirements of this Section. Stainless steel gates shall not be accepted for use as gravity flow gates. The sluice gate installations shall be furnished complete with frames, leaves, stems, adjustable stem guides, thimbles and anchor bolts, complete and operable in all respects as described herein and as indicated on the drawings. The gates shall be of the pressure seating type, and shall be designed for the face pressures and back pressures indicated in TABLE 1. The capacities of the operating stands shall be based upon the pressure exerted on the entire area enclosed by the gate sealing surfaces (seating faces). As used herein, operating pressure head is defined as the distance from the center of the slide, in its closed position, to the maximum water surface elevation. Sluice gates designated for power operation shall be sufficiently rugged to withstand operation by means of electric lifts or portable hydraulic operators. Gates used for gravity flow closure in gatewells shall not be considered for alternate fabrication and materials under any circumstances.

2.3.2 Wall Thimbles

Wall thimbles shall be of the F-type. The thimbles shall be of cast iron with the front-flange machined to a plane to provide a true-seating surface for the sluice gate frame. Holes shall be drilled and tapped in the thimble to match the mounting hole pattern of the sluice gate frame. The gate frames shall be attached to the thimble by studs. The wall thimble shall be internally braced during concrete placement. Thimble shall be plumb in both planes with + 1/16 inch. The overall wall thimble length be less than the wall thickness allowing room for an RCP pipe socket behind the thimble.

2.3.3 Frames

The frames shall be cast iron of ample section to prevent distortion. Seat facings shall be naval brass and shall be machined to a smooth finish for making a tight seal meeting the requirements of AWWA C 501. The frame guides shall be of cast iron. The frame guides shall be equipped with adjustable side wedges, and the guides shall be of sufficient length so that not less than one-half of the gate is within the guides when the gate is wide open. The side wedges shall be faced with manganese bronze. Wedges shall be designed in such a manner that wedge-fastening bolts may be

replaced without the removal of the gate frame from the masonry or other setting, and their attachments adequate to resist tight closures of the gates. Gates shall be provided with top wedges. Fabricated stainless steel frames will be permitted on pump station inlet and K14 gated manhole locations only.

2.3.4 Gate Leaves

Gate leaves shall be of cast iron, consisting of flat castings with horizontal and vertical ribs of ample section to withstand all of the specified conditions of operation with limited distortion to prevent leakage. The seating surfaces shall be of naval brass not less than 3/4" wide and shall be machined to a 63 micro-inch finish or better and attached by dovetail notching to make a watertight seal. The gate shall be guided in the frame with a tongue and groove construction. The tongue and grooves shall be machined full length with a 1/8" overall clearance in the frame guide groove. Slide wedges shall be faced with manganese bronze and mounted and secured to prevent rotation that would interfere with their proper action or cause the gate to bind, in addition to meeting the requirements of AWWA C 501. Fabricated gate slides of stainless steel shall be permitted on pump station inlet and K14 gated manhole locations only.

2.3.5 Stems

The stems shall be of stainless steel conforming to ASTM A 276, Type 302, 303, 304 with a 63 micro-inch finish if machine cut or 32 micro-inch if rolled threads, and shall be of the sizes recommended by the manufacturer. No detectable flaws or surface imperfections will be permitted. The stems shall be provided with thrust nuts of corrosion-resisting metal and shall have adjustable stop nuts to limit the upward and downward travel of the stems. The stems shall be of a size to withstand the axial compressive and tensile forces created during gate operation under the specified unbalanced heads and to transmit in compression at least two times the rated output of the lift with a 25-pound effort on the crank or handwheel. Threads on stems shall be machine cut or rolled with single or double lead threads of the Acme type. The exterior corners of the threads shall be given slight radius of approximately 0.015" in order to prevent them from acting as cutting edges as the stem passes through the left nut.

2.3.6 Stem Guides

Stem guides shall be a manufacturer's standard product, except as specified provided herein, and shall be adjustable in two directions to provide full adjustment for proper alignment of the stem. The stem bearing, in the stem guides, shall be brass or bronze brushed. The guides shall be anchored in an approved manner with not less than two bolts.

2.3.7 Asphalt and Sand

Asphalt and sand fill mixture shall be a relatively stiff mix of road asphalt and clean sand. The mixture shall be well tamped so as to have full contact with the embedded frame, and so as to provide a firm fill in the recess.

2.3.8 Wall Bracket

All gatewell sluice gates and the K14 gated manhole shall have a top wall mounting bracket supplied by the sluice gate manufacturer. The bracket material shall be cast iron or fabricated steel of sufficient size and section thickness to support the weight of the gate when supported by the gate hoist above the bracket. In addition, stresses from operation in the closing mode with debris lodged under the gate shall be designed into the bracket. The sluice gate manufacturer shall provide anchor bolt recommendations to the Contractor for the size of the gate.

2.4 OPERATING HOISTS

2.4.1 Hoists

Each sluice gate shall be provided with a manual hoisting unit. Manual hoisting units shall be of the hand crank operated, enclosed, pedestal type, equipped with machine cut gears, having gear ratios recommended by the hoist manufacturer. The hoisting units shall be made of cast iron or cast steel. Exposed fastening of 1-1/2" diameter and less shall have American Standard hexagon-socket (Allen) type wrench heads. The hoist shall have a cast bronze lift nut, threaded to match and engage with the stem threads. The lift nut shall be provided with ball or roller bearings both above and below a flange on the lift nut, to accommodate the opening and closing thrusts. Each hoist shall be provided with an integral position indicator. A brass plate shall be attached to the lift housing to show counter reading with gate in fully closed position. Each hoist shall be designed to unseat the slide from its wedging device at the maximum head with a maximum force of 40 pounds at 15" radius. Means for lubrication of the hoist shall be provided. No more than 16 turns of the hand crank or handwheel shall be required to move the gate 1 inch. A removable, cast-iron crank with a rotating brass grip and a radius of 15" shall be provided. All hoists shall be capable of being driven by the same portable operator.

2.4.2 Position Indicators

Weathertight and dust-tight, stem-position indicators shall be provided for all gate stands. The indicators shall be of the dial- or counter-type, mounted in a cast housing on top of the lift, and with the face of the counter showing through a recessed window in the housing and easily read from the crank location.

2.4.3 Stem Covers

Weathertight and dust-tight stem covers shall be provided to enclose and protect the threaded portion of the gate stem. Slotted galvanized steel stem covers shall be provided. The top of the stem shall be visible through the slot throughout its distance of travel during opening and closing operations. The slot shall be covered with a vandal resistant clear plastic material as recommended by the stem manufacturer and as approved. The above plastic material shall be installed as recommended by the stem manufacturer.

2.4.4 Bolts and Nuts

All anchor bolts for the rising stem type sluice gate frames and guides, stem guides, hoists and floor stands, and all bolts and studs used in the sluice gate leaves, frames and guides, and stem guides shall be stainless steel conforming to the requirements of ASTM A 276, Type 304.

2.5 PORTABLE OPERATOR

One portable hydraulic operating device shall be provided for opening and closing of all sluice gates in the project. The operator shall be portable, gasoline-engine powered, hydraulic-power unit mounted on a wheeled cart.

2.5.1 Hydraulic Motor Operator

The operator shall be portable and capable of opening and closing the gates at the speed and torque specified. The hydraulic motor shall be reversing-type. The dimensions of the coupling for connecting the motor to the gates shall be determined by the Contractor after gate selection. The hydraulic motor shall be designed for outdoor service and operate on power supplied by the hydraulic power unit. The hydraulic motor shall be capable of providing a minimum of 30 foot-pounds of torque for continuous duty while operating at a speed of not less than 140 RPM. The hydraulic motor shall develop a stall torque of 75 foot-pounds. Twenty feet of hydraulic reinforced hose suitable for pressures and flows shall be provided with the motor. An operating attachment shall be provided with the hydraulic motor. The attachment shall be designed to be received by an attachment plate on each gate hoist that aligns and secures the hydraulic motor to any operating hoist.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Installation Instructions

The setting, installation, assembly, lubrication, and testing of the gates and hoisting units shall be in accordance with the instructions of the gate manufacturer as approved by the Contracting Officer. These instructions shall be submitted for approval prior to any gate installation work. An erecting engineer shall inspect and determine the adherence to the above instructions for the setting of the gate thimble, rail assemblies, the stem guide anchor bolts, and the hoisting unit anchor bolts; the alignment and assembly of the stem to the sluice gate, stem guides, and hoisting unit; and observe the initial gate operations using the hoist. The Contractor shall make all arrangements for the presence of the erecting engineer for this inspection. The presence of the erecting engineer, however, will not relieve the Contractor of full responsibility.

3.1.2 Placement

Wall thimbles and anchor bolts shall be set in place prior to the placing

of concrete. Each unit shall be accurately aligned and, if upon completion of the work there is any misalignment or other defective workmanship which is likely to impede the operation of the gate, the necessary corrections shall be made by the Contractor at no additional expense to the Government. The bottom frame member of flush-bottom sluice gates shall be embedded in an asphalt mixture as shown.

3.1.3 Asphalt and Sand Mixture

Asphalt and sand fill mixture shall be a relatively stiff mix of road asphalt and clean sand. The asphalt material shall be Asphalt Cement (AC), Penetration Grade 120/150. The asphalt content shall not be less than 7% of the mix. The sand shall conform to the quality and gradation of fine aggregate for concrete as specified in ASTM C 33. The mixture shall be well tamped so as to have full contact with the embedded frame and to provide a firm fill in the recess.

3.1.4 Gate Vendor's Erecting Engineer

The erecting engineer shall be experienced in the specific installation of sluice gates as a complete system. Installation experience shall include as a minimum three successful installations of which at least one must have been in the last two years and at least one must have been a gate of the larger size furnished with this project. The Gate Vendor shall coordinate with the Contractor on the most advantageous times and durations necessary for his erecting engineer to be at construction site and be confident of the proper installation and operational function of their product. Vendor's erecting engineer shall initiate instructions for all actions necessary for the proper receipt, inspections, handling, assembly, installation, operation, and testing of this sluice gate system furnished by his company under this contract. Discrepancies shall be reported to the Contracting Officer. The Vendor's erecting engineer shall also keep records of measurements and actions taken during his visits and shall furnish a copy to the Contracting Officer on request or at the completion of each visit. Multiple visits may be required depending on installation sequencing. One of the visits shall be during final preparation and performance of the installed acceptance test. The erecting engineer shall instruct the Contractor in the operation and maintenance features of his company's installed sluice gate product. The following information will be submitted with the submittal package to verify the qualifications of the engineer:

- a. Experience, years of service, etc., as an erecting engineer.
- b. List of successful gate installations with owner's address and phone number.
- c. Size and type control of the installed gates.

3.1.5 Assembly

Prior to assembly, the gate stems shall be thoroughly cleaned, for inspection by the Contracting Officer or his representative. All parts of the gates and operating mechanisms shall be installed and fitted together

so that after final assembly there will be no interference through bad alignment, or any warping or twisting of the members that would in any way interfere with operation. All finished contact or bearing surfaces shall be true and exact to insure full and complete contact. All bolts for attaching the gate frames, stem guides, and operating hoists shall be accurately embedded at the time of placing concrete. Provisions for lubrication of the operating mechanisms shall be made and the lubrication systems shall be properly filled with suitable lubricant as recommended by the manufacturer of the hoists. When the sluice gate slide is in the fully closed position and wedged in position against the frame, maximum clearance between mating faces shall not exceed 0.004 inch.

3.2 TESTS

After final assembly, each gate shall be tested in the presence of the gate vendor's erecting engineer and the Contracting Officer or his representative by raising and lowering it throughout its complete travel by means of its operating mechanism and to demonstrate that it complies with the specifications. Any defective part of error in the construction or alignment of the complete gate discovered during the tests and trials shall be immediately corrected by the Contractor without cost to the Government.

3.2.1 Demonstration of Proper Functioning

Upon completion of the installation, each gate shall be lubricated and operated through as many cycles of opening and closing as may be necessary to demonstrate proper functioning of the gates and that the units are free from binding or other defects.

3.2.2 Testing

The portable operator shall be tested in the presence of the Contracting Officer in raising and lowering the gates.

3.3 PAINTING

The gate manufacturer shall be responsible for shop prime and finish painting of all sluice gates and appurtenances supplied under this contract. Stainless steel gates shall not be painted. All coatings shall conform with VOC Emission Regulations in effect at the manufacturing location and at project site to allow touch-up or recoating to be performed with the same products. The type of paint shall be as specified in the following schedule. Where required by application the coating shall be approved for contact with drinking water by the NSF, EPA, or other appropriate governing agencies. Number of coats, mil thickness and surface preparation shall be in accordance with the paint manufacturer's recommendations for that application, but in no case shall be less than the requirements in the following schedule. All coatings shall be free of carcinogens as listed on the IARC monographs. Colors are to be manufacturer's standards, provided they are selected for ease of manufacturer's standards, provided they are selected for ease of field touch-up and color match and are fade resistant. Colors shall be selected

to provide contrast between the product and the prime coat, and between the prime coat and the finish coat, to insure uniform covering and coating thickness. All coatings shall be applied in accordance with the paint manufacturer's recommendations for thinning, technique and safety precautions.

3.3.1 Painting Schedule

Application	Materials	Preparation	1st Coat	2nd Coat	3rd Coat
Gates, Wall	Cast Iron	SP 6	Amine Mod.	Amine Mod.	None
Thimbles			Pol. Epoxy	Pol. Epoxy	
			Amerlock 400	Amerlock 400	
			or Equal,	or Equal,	
			5 mils, min.	5 mils, min.	

3.4 TOOLS

One set of wrenches and special tools required for the operation and maintenance of the sluice gates installed under this contract shall be furnished at the time of the trial operation.

-- End of Section --

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SECTION 15060

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06/02

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SECTION 15060

DISCHARGE PIPELINES 06/02

PART 1 GENERAL

1.1 SCOPE

This section covers discharge piping and associated flap valves for the pumps at the K14 pump station.

1.2 RELATED WORK OF OTHER SECTIONS

The following items are covered under other sections:

- (1) Pump work: SECTION 15161: ELECTRIC PUMPING EQUIPMENT.
- (2) Submittal Procedures: SECTION 01330: SUBMITTAL PROCEDURES

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B1.1	(1989) Unified Inch Screw Threads (UN and UNR Thread Form).
ANSI B16.5	(1988) Pipe Flanges and Flanged Fittings.
ANSI B18.2.1	(1981) Square and Hex Bolts and Screws Inch Series
ANSI B18.2.2	(1987) Square and Hex Nuts (inch Series)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 536	(1984) Ductile Iron Castings
ASTM B 98	(1997)Copper-Silicon Alloy Rod, Bar, and Shapes
ASTM B 584	(1996) Copper Alloy Sand Casings for General Applications

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME Section IX (1992) Boiler and Pressure Vessel Code,

Section IX, Welding and Brazing

Procedures, Welders, Brazers, and Welding

and Brazing Operators.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 (1992) Structural Welding Code Steel.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C 104	(1990) Cement-Morar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C 105/A21.5	Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
AWWA C 110	(1987) Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. for Water and Other Liquids
AWWA C 111	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C 115	(1988) Flanged Ductile-Iron Pipe with Threaded Flanges
AWWA C 150	(1991) Thickness Design of Ductile-Iron Pipe
AWWA C 151	(1991) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C 206	(1991) Field Welding of Steel Water Pipe

MANUFACTURER'S STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC. (MSS)

MSS SP-58	(1988) Pipe Hangers and Supports - Materials, Design and Manufacture
MSS SP-69	(1991) Pipe Hangers and Supports -

Selection and Application

MSS SP-89

(1991) Pipe Hangers and Supports - Fabrication and Installation Practices

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Coatings; GA

Data on the manufacturer's standard coatings for new valves, new pipes, and new fittings.

SD-04 Drawings

Materials and Equipment; GA.

Shop drawings shall be submitted for all materials and equipment. Components of the system shall be submitted together as a complete package. Shop drawings shall include: manufacturer's descriptive and technical literature, performance charts, and catalog cuts; complete piping diagrams; details and data on equipment layout and anchorage, couplings, and supports, anchors; and other details necessary to demonstrate that each proposed system has been coordinated and will properly function as a unit. Shop drawings shall show clearances needed for maintenance and operation. The following shop drawings shall be submitted:

- (a) Shop drawings on the layout and installation of the pump discharge lines at the K14 pump station including sump pump discharge lines. The complete pump discharge piping system shall be shown on a scaled engineering drawing. A drawing of buried discharge lines between the pump station and gatewell shall also be shown on scaled engineering drawings with any required angular offset at mechanical joint fittings to achieve the desired routing. All support details, flexible couplings and anchors, including welding details, shall be provided.
- (b) Submit mounting details for flap valves for pump discharge lines.

SD-09 Reports

Performance Test Reports; FIO

Upon completion, including testing, of each installed system, test reports shall be submitted in booklet form presenting all field tests performed. Performance test reports shall be included in the operation and maintenance manual specified in SECTION: 15161 ELECTRIC PUMPING EQUIPMENT.

SD-13 Certificates

Piping; GA

Certificates of compliance shall be submitted for piping.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Pipe sizes shall be as shown. In general, pipe material shall be ductile iron with flaged joints or mechanical joint for fittings buried under ground. Materials and equipment shall be the standard products of manufacturers regularly engaged in the manufacture of such items. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 3 years prior to the contract award date.

2.1.1 Asbestos Prohibition

Asbestos and products containing asbestos shall not be used and will not be permitted on the contract work.

2.1.2 Verification of Dimensions

The Contractor shall be familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy prior to performing the work.

2.1.3 Welding Procedures

Welding details for piping supports and anchors (Materials and Equipment) shall be submitted for approval. Welding shall be performed in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME Section IX Boiler and Pressure Vessel Code, and/or AWS D1.1.

2.2 MATERIALS AND EQUIPMENT

2.2.1 Ductile Iron Pipe

AWWA C 150 and AWWA C 151, thickness class 53 for flanged piping. Pipe sizes shall be as indicated on the drawings. Certificates of compliance stating that Piping meets the specifications shall be submitted prior to installing the piping.

2.2.2 Fittings

Material, thickness, and pressure rating shall be Class 150. Linings, coatings, and wrappings shall be as specified for the pipe except hand applications may be used when machine application is not practicable. Fittings shall conform to AWWA C 110 and ANSI B16.5 as appropriate. Flanged end pipe shall be in accordance with AWWA C 115 Class 150. Flanges shall be ductile iron in accordance with AWWA C 110. All mechanical joint fittings shall be of the restrained type.

2.2.3 Mechanical Joints

High deflection mechanical joint couplings shall be used at all gatewell pipe connections as shown on the drawings. High deflection joints shall conform to ANSI/AWWA C153/A21.53. High deflection joints shall allow a 12-20 degree deflection angle over a 20 foot laying length depending on the pipe size. All other mechanical joints shall conform to AWWA C 111. Restrained mechanical joints shall allow a 3 - 5 degree deflection angle over an 18 foot laying length.

2.2.4 Protective Coatings and Linings

Pipes, fittings, and couplings shall be coated inside and coated outside with a minimum 2 mil thickness (dry) asphaltic paint in accordance with AWWA C 151. In addition, buried lines shall have a polyethylene encasement applied and installed in accordance with AWWA C 105/A21.5. Minimum thickness shall be eight (8) mils. Manufacturer's data on the Coatings shall be submitted prior to installing coated items.

2.2.5 Bolts and Nuts

Size, length, and number of bolts and nuts for the pipe flanges shall be in accordance with AWWA C 110 and AWWA C 115. Bolts shall conform to ANSI B18.2.1 and nuts to ANSI B18.2.2. Threads shall conform to ANSI B1.1. "T" bolts used in restrained joint fittings shall be of stainless steel material.

2.2.5.1 Bolts and Nuts (Interior Piping)

Size, length, and number of bolts and nuts for the pipe flanges on interior pipe connections, pipe hangers, hanger rods or supports shall be of stainless steel bolting material and utilize silicon bronze nuts.

2.2.6 Hangers, Inserts, and Supports

Shall be in accordance with MSS SP-58, MSS SP-69, and MSS SP-89. Welding details for piping supports shall be submitted for approval.

2.2.7 Flexible Couplings

A sleeve type flexible coupling shall be furnished to be install on each buried discharge line approximately 5 feet outside the pump station wall. The sleeve coupling shall include a steel sleeve that fits over the D.I.P. pipe with each end closed by a gasket and follower made of malleable, ductile iron or steel. The gasket shall be a rubber compound that is compressed by action of the followers on the D.I.P. barrel. Bolts and nuts shall be high strength low alloy material meeting ASTM A 325 Type 3. The bolts shall be long enough to pass through both followers and gaskets when assembled on the sleeve ends. Bolts shall be tightened per the manufacturer's recommendation.

2.2.8 Annular Wall Seal

All wall and floor penetrations of discharge pipes shall incorporate a

compressible ring seal system between the concrete opening and the discharge pipe. All concrete openings shall be sized per the seal manufacturer's recommendation for the size of pipe involved. The annular ring system has modular seal rubber links that interlock and are compressed by outer plates made of a molded glass reinforced nylon. These plates on each end of a rubber seal stack transmit the compressive force of 316 fasteners and nuts into the seal assembly. Seal assemblies shall be similar or equal to Link Seal Modular Seals as manufactured by PSI/Thunderline/Link-Seal of Houston, TX.77021.

2.2.9 Flap Valves for Pump Discharge Lines

Circular discharge flap valves shall be provided for flange mounting and pump discharge service on the ductile iron discharge lines. Each valve shall be able to withstand stresses resulting from static head on the face of the gate and the reaction forces from the pump discharge through the gate. The valve body shall ductile iron conforming to ASTM A 536, spherically dished, with flanged faced and drilled for ANSI B16.5 standard pipe flange. A resilient neoprene or Buna-N seat shall be bonded in a groove machined in the body. Hinge arms shall be high tensile bronze conforming to ASTM B 584 with silicon bronze pins conforming to ASTM B 98. Arms shall have two pivot points with adjustable lower pivot for limited rotation and a threaded upper hinge post for flap valve sensitivity. Spring bumpers shall be provided to prevent valves from opening more than 90 degrees. Lubrication fittings shall be provided at all bushings. Flap valves shall be Rodney Hunt Series FV-ACP as manufactured by Rodney Hunt Co., Orange, Massachusettes.

2.2.10 Flap Valves for Underwater Immersion

Flap valves shall be furnished with the valve manufacturer's standard coating system for underwater.

PART 3 EXECUTION

3.1 INSTALLATION

Install these valves at the discharge ends of the pipes as shown on the drawings with a flanged connection to the discharge pipe. Installation of the flap valves at the pump station discharges shall be coordinated with the pump discharge pipe installation. Contractor to provide fittings as required. Unless otherwise required, materials and equipment shall be installed in accordance with the manufacturer's written recommendations. The Contractor shall design and provide all supports and anchors, as necessary, as submitted and approved.

3.1.1 Pipes and Fittings

Piping shall be carefully laid out in advance and unnecessary cutting of materials shall be avoided. Pipe openings shall be closed with caps or plugs during installation. Equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury.

3.1.2 Connecting Piping to Pumps

The Contractor shall lay out the pump discharge piping and connect to pump discharge shoes at the Pump Stations. Sump pump discharge piping shall also be located and installed as shown.

3.1.3 Assembly

Pipe ends shall be clean and free from indentations, projections, and roll marks. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service and conform to AWWA C 110 and AWWA C 115. Assembly of the flanged joints and mechanical joints shall be in accordance with the pipe manufacturer's standard method. After buried pipe is installed and before testing or backfill is placed, the coating shall be visually inspected for flaws and defects shall be repaired.

3.1.4 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Squeeze type mechanical cutters shall not be used for ductile iron.

3.1.5 Welding

Welding shall be performed in accordance with qualified procedures using performance qualified welders and welding operators. Procedures and welders shall be qualified in accordance with the ASME Section IX Boiler and Pressure Vessel Code, and/or AWS D1.1. Field welding shall be in accordance with AWWA C 206. The names of qualified welders shall be furnished to the Contracting Officer prior to starting installation of welded piping.

3.2 TESTING

Miscellaneous piping at each pumping station shall be tested and inspected at the time of the pumping tests. Valves shall be operated, tested, and inspected at the at the time of the pumping tests. If inspection or testing shows leaks or defects, such defective work or material shall be repaired or replaced as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. Performance Test Reports shall be submitted upon the completion of each test.

3.2.1 Pressure Test

After the pipe is laid and the joints completed, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected to 1 hour to a hydrostatic pressure test of 30 psi. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, and valves shall be carefully examined during the test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, valves, discovered in consequence of this pressure test shall be removed and replaced with sound

material, and the test shall be repeated until the test results are satisfactory.

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SECTION 15161

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SECTION 15161

ELECTRIC PUMPING EQUIPMENT (MODIFIED FOR PUMP INSTALLATION) 06/02

PART 1 GENERAL

1.1 SCOPE

This section covers the installation of the electric submersible pumps at K14 pump station as shown. A total of two pumps are required. In addition, the pump station has one sump pump each.

1.2 RELATED WORK OF OTHER SECTIONS

The following items are covered under other sections.

- (1) Government Furnished Equipment: SECTION 01000: GENERAL
- (2) Discharge Piping: SECTION 15060: DISCHARGE PIPELINES
- (3) Submittal Procedures: SECTION 01330: SUBMITTAL PROCEDURES
- (4) Electrical requirements: SECTION 16415: ELECTRICAL WORK, INTERIOR

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B4.1	(1994) Preferred Limits and Fits for Cylindrical Parts
ANSI B16.5	(1988) Pipe Flanges and Flanged Fittings
ANSI B17.1	(1967, R1989) Keys and Keyseats
ANSI B46.1	(1985) Surface Texture (Surface Roughness, Waviness and Lav)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 27	(1993) Steel Castings, Carbon, for General Application
ASTM A 36	(1994) Structural Steel

ASTM A 48	(1994) Gray Iron Castings
ASTM A 108	(1993) Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 120	(1994) Black and Hot-Dipped Zinc-Coated (Galvanized) Welded & Seamless Steel Pipe for Ordinary Uses.
ASTM A 193	(1994) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A 194	(1994) Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
ASTM A 276	(1994) Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 285	(1990) Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength
ASTM A 516	(1990) Pressure Vessel Plates, Carbon Steel, for Moderate and Lower Temperature Service
ASTM A 564	(1992A) Hot-Rolled and Cold-Finished Age-Hardening Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A 576	(1990B) Steel Bars, Carbon, Hot Rolled Special Quality
ASTM A 668	(1991) Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM A 743	(1992) Castings Iron -Chromium, Iron-Chromium-Nickel, Corrosion-Resistant, for General Use
ASTM B 98	Specification for Copper-Silicon Alloy Rod, Bar, and Shapes
ASTM B 148	(1992A) Aluminum-Bronze Sand Castings
ASTM B 584	(1991A) Copper Alloy Sand Castings for General Applications

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation;

submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Pump Setting Drawings; GA

The Contractor shall submit pump setting plans and elevations for each size of pump in each pump station that indicates location of the access hatch and pump below in a pump bay with respect to discharge wall and proximity of any discharge pipe to frame (pump station K14). The setting elevation drawing shall indicate the locations of access frame, pump discharge shoe, guide rail system, pump concrete support pedestal, sump floor, operation floor, discharge wall and monorail hoist pick point vertical centerline. In addition sump pumps will show plan and elevation of the sump pit on those drawings. These drawings will be reviewed and approved by the Contracting Officer's Representative before placing any access hatches.

SD-06 Instructions

Installation and Erection; GA.

- (1) Installation and Erection Instructions: The Contractor shall review printed and bound manuals describing the procedures for erecting, assembling, and installing the pumps and controls. These procedures will be followed by a pump installation contractor under the supervision of an erecting engineer. The manuals shall be submitted with any comments or questions at the time the pump shop drawings are reviewed.
- (2) The installation description is a complete, orderly, step-by-step explanation of the various operations required to install each type of pump including the guide rails or cables and discharge shoe. It describes all special procedures and outlines special precautions. It includes such things as bolt torque values, permissible wear ring clearances, recommended instrument set-ups, recommended gages and instruments, bearing clearances, and similar details.
- (3) The Description may be complemented and supplemented by contractor comments, drawings, sketches, photographs, and similar materials as necessary. The overall result shall be a description which may be comprehended by an engineer or mechanic without extensive experience in erecting or installing pumps of the type required.
- (4) After review, the Government will furnish to the Contractor recommended comments and direction as necessary or desirable for the installation procedure and return two copies of the previously reviewed manual back to the Contractor. Differences of opinion between the Contractor, pump manufacturer, and Contracting Officer shall be reconciled in a manner mutually agreeable to all parties, and two copies of the reviewed and annotated manual shall be submitted to the Contracting Officer's Representative. The final approved installation

instructions shall be followed by the installation personnel for the completion of pump installation work.

SD-09 Reports

Test Results; FIO

Test results of field tests shall be submitted as specified in PARAGRAPH: FIELD TESTING.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Manual; GA

The Contractor shall review, prior to installation of any pumps to the project work site, a copy of the manual containing complete information in connection with the operation, lubrication, adjustment, routine and special maintenance, disassembly, repair, and reassembly of the pumps and accessories. The manual may include a listing of special tools required for working on the pumps and controls. The manual shall: incorporate complete information of the controls covered under this section and other pertinent electrical and mechanical sections; and include operation and maintenance procedures, special features, and instructions for setting all adjustable controls and equipment. Comprehensive as-installed drawings, photographs, field test results, and sketches of the pump installations shall be included.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Pumps shall be installed at the pumping locations as shown. A total of two pumps shall be installed at location K14.

2.1.1 Coordination

The Contractor shall install the controls required for the installation contract work. The Contractor is responsible for coordinating with the Government furnished equipment supplier to gain a full understanding of the installation manuals and procedures provided. Electrical requirements are given in SECTION: 16415 ELECTRICAL WORK, INTERIOR. All pump shop drawings and control shop drawings shall be coordinated and all electrical and mechanical installation details submitted.

2.1.2 Nameplates

Each major item of equipment has the manufacturer's name, address, type/style, model, serial number, and catalog number on a plate secured to the item of equipment. Nameplates are made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background. The Contractor shall review the nameplate data and report any discrepancies to the Contracting Officer.

2.1.3 Instruction Plates

As necessary, each item of equipment has been equipped with suitably installed instruction plates including warning and cautions describing special and important procedures to be followed while starting, operating and servicing the equipment. The plates are made of corrosion resisting metal with raised or depressed lettering on a contrasting colored background.

2.1.4 Verification of Dimensions

The Contractor shall be familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy prior to performing the work.

2.2 MATERIALS

Materials not specifically described shall, as far as practicable, conform to the latest approved industry standard(s) covering the appropriate class or types of materials.

2.2.1 Material Standards

Designated items shall conform to the following:

Item	Requirements
Cast Iron	ASTM A 48, Class No. 30A, 30B, and 30C
Cast Steel	ASTM A 27, Grade 65-35, annealed
Copper Alloy Castings	ASTM B 584, Alloy No. C93700 or C86300
Structural Steel	ASTM A 36
Cold Rolled Steel Bars	ASTM A 108, Minimum Working Strength
	65,000 pounds per square inch
Hot Rolled Steel Bars	ASTM A 576, Grades: G10200, G10450, G1140
Hot Rolled Stainless	ASTM A 564, Grade 517400
Bars and Shapes:	
Steel Plates, Structural	ASTM A 285, Grade B
Steel Plates, Pressure Vessel	ASTM A 516, Grade 55
Steel Forgings	ASTM A 668, Class F

2.2.2 Pump Discharge Elbow

Pump discharge elbow has been furnished by the pump supplier. The discharge elbow is made of either cast iron or cast steel and consists of a flange for mating with the pump volute and discharge bowl. The discharge elbow has a cast iron shoe for anchoring to the sump floor. The seal between the pump volute and discharge shoe shall remain tight and intact under any pump thrust. No pump thrust will be induce on the guide rails.

2.2.3 Pump Access Hatches

The pump supplier has furnished the access hatches required for each pump. Covers (doors) are a minimum ¼" thick, extruded 6061 aluminum construction, and designed for incorporating the guiderail system for each pump. Covers (doors) are double leaf design, rated for 300 pounds per square foot, and

have diamond tread surfacing. Hatches are complete including framing, flush locking mechanism, handles and hardware. The frame is extruded aluminum, minimum ½" thick, with concrete anchors as part of the extrusion. All hardware shall be stainless steel. Covers have stainless steel hinges, complete heavy duty springs, and open to 90 degrees and lock automatically in the open position. Covers will close flush with the frame, resting on a ½" wide lip around the entire perimeter of the frame. A stainless steel safety chain is provided, attached to the cover leaves. The chain shall help prevent a person from falling into the wetwell when the hatch covers are open. Sump pump access hatches are designed for heavier loading and will take a 5000 lb. distributed load over the cover surface

2.2.4 Anchor Bolts

The Contractor shall furnish anchor bolts for each pump to be installed in this contract. The sizes and lengths shall be as recommended by the pump manufacturer with the anchor bolt and flat washer material to be stainless steel and the nuts shall be silicon bronze.

2.2.5 Guide Pipes

The Contractor shall furnish two guide pipes of stainless steel material for each pump to use with the pump lifting system. Required size shall be 2" pipes (depending on pump size) that are continuous between attachment points at the access frame, discharge shoe and any intermediate supports as required. Pipe shall meet ASTM A 120 butt welded Schedule 40 material.

2.3 SPARE PARTS AND SPECIAL TOOLS

2.3.1 Inspection and Inventory

The Contractor shall inspect and inventory all special tools that are unique to the pump or control system for proper installation, testing, operation, and/or maintenance. Special tools shall be delivered when the pumps and controls are installed.

2.3.2 Spare Parts

All spare parts are the duplicates to the original parts furnished and are interchangeable with those parts.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 General

Installation of the new pumps shall be in accordance with the manufacturer's installation procedure as outlined in the approved installation manual. Contractor shall submit for approval the connection details of the 6" D.I.P. to the base flow/sump pumps. Base flow/sump pumps shall be of 500 gpm capacity. The base flow/sump pumps shall be connected into an 6" D.I.P. discharge system as shown on the drawings.

3.1.1.1 Piping Layout

Storm water pumps are of 3000 gpm capacity K14. These pump sizes require 12" D.I.P. discharge lines. The Contractor shall furnish complete piping layouts with accurate discharge shoe dimensions for all pumping stations. The hatch cover interior edge will determine the discharge shoe location on the sump floor by virtue of the pump guide system. All concrete pedestals supporting the discharge shoes shall be sized and installed per the pump manufacturer's recommendations and submitted to the Contracting Officer's Representative for approval.

3.1.1.2 Access Hatches

3.1.1.2 Access Hatches shall be cleaned of any manufacturing residue and given a coating of bituminous sealer on embed surfaces before embedding in the concrete operating floor slab. The Contractor may elect to use a second pour or grout embedding of the hatch to structural floor slab. At location K14, the Contractor shall set an access hatch in the "1st" pump bay that contains the sump pump without a storm water pump in that pump bay. That access hatch will be placed at the exact same location from the rear wall and divider walls as pump bays #2 and #3.

3.1.1.3 Packaging, Marking, and Acceptance

The Contractor shall obtain the Government Furnished Pumping Equipment from a storage area in the Water Treatment Facility in Grand Forks, ND as specified in SECTION 01000: GENERAL. He shall inspect the pumps and control equipment after receipt to verify the equipment as completely wired as feasible and undamaged in order to minimize site installation work. The pumps and pump control equipment shall be uncrated carefully to prevent damage that would effect assembly and installation.

Within five calendar days after retrieval from the designated point of storage, the items shall be inspected by the Contractor. The inspection shall include an accounting of the items delivered and a visual inspection to determine any possible damage during handling. If this inspection reveals any defects or deviations from the contract requirements that could render the items unsuitable for the use intended, the Contractor shall notify the Contracting Officer's Representative and identify the deficiency(s).

3.1.1.4 Services of Pump Manufacturer's Erecting Engineer

An erection engineer, supplied under a contract with KSB Inc. and the Government, and regularly employed by this pump manufacturer shall inspect the submersible pump installation and determine the level of adherence to the approved installation instructions. The services shall be as designated in the supply contract and administered and monitored by the Contracting Officer's Representative. The services may include supervision of the setting of the discharge shoes, alignment and assembly of the pumps and the initial testing and operation of the pumps. The Contractor shall submit a request to the Contracting Officer's Representative for the presence of the erection engineer at least 14 calendar days in advance.

3.2 FIELD TESTING

3.2.1 General

All equipment shall be operated by the Contractor at his or her own expense to determine if joints leak and if the pumps have been properly erected and connected. Such testing shall be made at the direction of the Contracting Officer. The Contractor shall furnish all the electricity, and water required for the testing. Contractor shall only be responsible for installation deficiencies of the pumping equipment as determined by the Government.

3.2.2 Field Testing

Field testing for the pump units shall be conducted within a reasonable time following completion of the equipment installation. The Contractor and Contracting Officer will jointly determine the date on which installation of the equipment is considered to have been completed to the extent that the testing can be performed. The testing shall thereafter proceed as expeditiously as practicable with all testing to be completed within 30 calendar days after the installation completion date.

3.2.3 Pump Testing

The submersible pumps shall be tested in the dry to determine whether they have been properly erected and connected. Such testing shall be made when and as directed. After the pumping units have been completely assembled, including all rotating elements, each unit shall be operated at full rated speed for two periods of 2 minutes in order to assure proper installation satisfactory operation. A ten-minute idle time between tests shall be provided. The Contractor shall conduct vibration measurements on all the pump units. Results of the pump testing shall be submitted to Contracting Officer.

3.2.3.1 Operating Condition Testing

All pumping units shall be run under operating conditions to insure that there are no leaks at any of the joints. Pumps shall be run under operating conditions for a total period of four hours. Should there be insufficient water to perform the testing, the Contracting Officer may at its option waive such testing. The Contractor shall demonstrate the removal and installation procedures of the submersible pumps by removing and then reinstalling them with any two pumps at each pump station utilizing the electric overhead monorail hoist.

3.2.4 Testing Submittal

The Contractor shall measure an submit the following: each motor total electrical power draw (in KVA) and each motor active electric power draw (in KW) for both the dry and wet testing; and the recorded actual operating revolutions per minute of each pump. Serial number, pump size, and the pump station name and location within the station shall identify all pumps when the pumps are tested.

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SECTION 15400

PLUMBING 06/02

PART 1 GENERAL

1.1 SCOPE

Applicable provisions of Division 1 shall govern work under this section. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or herein specified, including all materials, equipment, and incidentals necessary to produce a complete and operating system.

1.2 DESCRIPTION OF THE SYSTEM

- (1) Provide fixtures, specialties, equipment and all related piping as shown on floor plans, scheduled, and/or specified for a complete working system.
- (2) Provide all necessary sanitary waste, vent, and water piping, and ventilating as shown on floor plans, scheduled, and/or specified for a complete working system.
- (3) Provide electric water heater as shown on floor plans, schedule and/or specified.
- (4) Provide all sanitary waste and vent piping as shown from a point 5 feet outside building wall to all fixtures and/or appliances. Coordinate location and invert on sanitary sewer connection point to sewer line 5 feet outside building wall before proceeding with any work.
- (5) Provide all water piping as shown from a point 5 feet outside building wall to all fixtures and/or appliances.
- (6) All water piping shall be installed with pitch for seasonal drainage. This building is or seasonal use.
- (7) Contractor to properly instruct the Contracting Officer's Representative in the winterizing of the plumbing systems which includes the draining down water piping and removing water in service to meter, drainage of storage tank, and using RV anti-freeze. Winterize all traps by water removal and filling with RV anti-freeze.

1.3 REFERENCES

All work specified in this section and applicable provisions of Division 1

shall conform to all applicable codes and to the standards for materials and workmanship of the nationally recognized approval agencies and trade associations such as the American Society of Mechanical Engineers, the American Society for Testing and Materials, the American Standards Association, National Fire Protection Association.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Shop Drawings; GA.

Shop drawings shall contain complete dimensional, operational, material quality and manufacturer information on all fixture, specialty and equipment items. The Contractor shall be responsible for transmitting copies of the approved shop drawings to the other affected trades. Shop drawings are required on the following items:

- (1) Fixtures and Trim
- (2) Drains and Cleanouts
- (3) Valves
- (4) Water Heater EWH-1
- (5) Storage Tank ST-1

1.5 GENERAL PROVISIONS

1.5.1 Drawings

- (1) Plans of piping and fixtures shown on scale drawings, are diagrammatic only. They are intended to indicate size and/or capacity where stipulated, approximate location and/or direction and approximate general arrangement of one phase of work to another, but not to the exact detail or arrangement of construction. Plans are based on equipment scheduled. Contractor shall be responsible for changes resulting from equipment other than scheduled.
- (2) If it is found before installation, that a more convenient, suitable or workable arrangement for any or all phases of the project would result by varying or altering the arrangement indicated on the drawings, Contractor may change the location or arrangement of his work without additional cost to the Government but only after obtaining a written approval by the Contracting Officer.
- (3) Mechanical systems are shown on drawings that were closely coordinated with the Architectural drawings, however, minor variations may occur. Contractor shall verify dimensions, heights, door swings, and any other information critical to the placement of devices, with the architectural drawings to assure proper installation. Field measurements shall take precedence over drawing dimensions and shall be

verified. Plans shall not be scaled to locate equipment.

(4) All plumbing piping installations shall closely match the drawings as approved by the current Minnesota Plumbing Code. Any variation from or additions to the piping arrangement will require a revision or resubmittal to the Contracting Officer at the Contractor's expense.

1.5.2 Materials

- (1) Each major component of the equipment shall have the manufacturer's name, address, catalog and serial number permanently attached in a conspicuous place.
- (2) The same brand or manufacturer shall be used for each specific application of fixtures, pumps, valves, fittings, controls and other equipment.
- (3) All materials shall be new and of the quality specified and meet approval as per current Minnesota Plumbing Code.
- (4) All equipment shall be listed, approved or rated by a nationally recognized testing and rating bureau or the recognized manufacturers association responsible for setting industry standards. All electrical equipment and apparatus shall be U.L. listed. Examples of recognized associations are:

American Concrete Pipe Association
American Pipe Fitting Institute
American Water Works Association
Plastic Pipe Institute
Thermal Insulation Manufacturers Association

1.5.3 Equipment Substitutions

It is the intent of this specification to permit the use of the materials of any nationally recognized manufacturer so long as they are fully equal to the quality and performance of the named item in the opinion of the Contracting Officer. Materials or equipment of other manufacturers may be used upon the following conditions:

- (1) The proposed substitute is equal in design, materials, construction and performance in the opinion of the Contracting Officer. No compromise in quality level will be allowed.
- (2) The service capabilities, availability of service parts and stability of the manufacturer are adequate in the opinion of the Contracting Officer.
- (3) The Contractor assumes responsibility for any modifications required for the installation of substitute equipment.
- (4) Substitute equipment shall fit into the space provided with adequate provisions for service and maintenance and must meet product approval as per current Minnesota Plumbing Code. Any substitute

equipment that causes variation of or deviation from original piping arrangement may require a revision to be submitted to the Contracting Officer at the Contractor's expense.

1.5.3.1 Approval of Substitutions

Approval of materials and equipment will be by review and approval of project shop drawings.

PART 2 PRODUCTS

2.1 PIPING SYSTEMS

2.1.1 Exterior Water

Type "K" soft temper copper pipe with a working pressure of 150 psig at 73.4° F. and in accordance with ASTM B42 and ASTM B88 standards.

2.1.1.1 Fittings

- (1) Wrot copper solder joint fittings in accordance with ANSI Std. B16.22; B16.29; B16.43.
- (2) Cast copper alloy solder joint fittings in accordance with ANSI std. B16.18; B16.23; B16.26; B16.32

2.1.1.2 Soldered Joints

- (1) Clean all surfaces per manufacturers installation recommendations.
- (2) Apply non-toxic flux to all joint surfaces.
- (3) Jointing shall be made with lead-free solder conforming to ASTM B32.

2.1.1.3 Pipe and Fittings

All pipe and fittings shall be installed per manufacturer's recommendations.

2.1.1.4 Valves for Water Service

Valves for Water Service shall have ends suited for proper installation in piping. Valves shall meet local standards or, in absence of such standards, the requirements below.

- (1) Curb stop (3/4 inch thru 2 inch size) Minneapolis pattern H-15150 or H-15250 equal to Mueller Co. or McDonald.
- (2) Curb Box. Minneapolis pattern base, cast iron extension type, 1 foot telescope length, 7'-0" length minimum, cast iron lid with plug.

2.1.1.5 Blow Out Tee

Provide and install curb box with water line blow out tee in main service

to building.

2.1.2 Interior Water

2.1.2.1 Piping Below Floor Slab

Type "K" soft temper copper with wrot copper solder joint fittings and jointing material shall be lead free solder and non-toxic flux.

2.1.2.2 Piping Above Floor

Type "L" hard tempered copper with wrot copper solder joint fittings and jointing material shall be lead free solder and non-toxic flux.

2.1.3 Exterior Sanitary Building Sewer

- (1) PVC Pipe (ASTM-D 3034) with rubber gasket joints (ASTM-D 3212)
- (2) Schedule 40 PVC (ASTM-D 2665) with solvent cement joints (ASTM-D 2564)
- (3) Fittings required shall meet specifications for respective piping.
- (4) Provide cleanouts as required per current Minnesota Plumbing Code.

2.1.4 Frost Protection - Sanitary Sewers

- (1) Piping shall be protected per current Minnesota Plumbing Code.
- (2) The insulation shall be built up with 1 inch extruded polystyrene insulation to required thickness with staggered joints.

2.1.5 Interior Sanitary and Vent

- (1) Cast iron no-hub pipe (CISPI-301) with mechanical sleeve joints (CISPI-310). Tyler pipe and fittings.
- (2) Galvanized steel pipe, above ground only, (ASTM-A53; ASTM-A120) with screwed or cast iron drainage pattern fittings.
- (3) Schedule 40 PVC pipe (ASTM-D2665) with socket solvent cemented joints (ASTM-D2855). PVC piping shall not run in air plenum ceilings, air shafts or ducts.
- (4) Fittings required shall meet specifications for respective piping.
- (5) Extend vents 12 inches above finished roof or above normal snow depth.
- (6) Provide approved roof flashing to correspond with roof covering being installed or with existing roof covering. Verify with roof installer so as to not void warranty of roof.

2.1.6 Horizontal Soil and Storm Lines

Lines shall pitch down a minimum of 1/8 inch per foot in the direction of flow, or as indicated on the drawings. Soil and waste branch piping shall pitch down 1/4 inch per foot. All vent piping shall drip back into waste piping. Stacks shall be run vertically. Changes of direction 45° or more from vertical to horizontal shall be made with long sweep elbows. Horizontal changes in direction shall be made with "Y" or "Y" and 1/8 bend combination fitting.

2.2 PIPE HANGERS

Furnish and install suitable hangers and supports for all horizontal lines. Hangers and supports shall be Grinnell, Mason, F&M, Michigan or equal. Heavy pipes shall be carried by pipe hangers supported by rods secured to structure. No piping shall be hung from other piping or ductwork. In no case shall hangers be supported by means of vertical expansion bolts.

2.2.1 Support Spacing

Piping shall be supported at distances not to exceed those specified.

Pipe Material	Maximum Horizontal Spacing (feet)	Vertical Spacing
Acrylonitrile Butadiene Styrene (ABS)	4	10
Brass	10	10
Cast Iron	5a	15
Copper or Copper-Alloy Pipe	12	10
Copper or Copper-Alloy Tubing		
<pre>< 1-1/4" diameter</pre>	6	10
<pre>> 1-1/2" diameter</pre>	10	10
<pre>Chlorinated Polyvinyl Chloride (CPVC):</pre>	3 4	5b 6b
Crosslinked Polyethylene (PEX)	2-2/3	4
Ductile Iron	5a	15
Galvanized Steel	12	15
Lead	Continuous	4
Polybutylene (PB)	2-2/3	4
Polyvinyl Chloride	4	10
Stainless Steel	12	15

Note a: The maximum horizontal spacing for supports may be increased to 10 feet when 10-foot lengths of pipe are employed.

Note b: Mid-story guide is to be employed.

Note c: " < " means less than or equal to.

" > " means greater than or equal to.

2.3 VALVES

2.3.1 General

Provide all valves shown on the plans and as required by applicable state and local codes. Valves manufactured by Milwaukee, Nibco, Jomar, Watts or Apollo are acceptable. All valves shall be suitable for 125 PSIG working pressure unless otherwise specified.

2.3.2 Control Valve

A control valve for water supply piping 3/4 inches through 4 inches in diameter which serves 2 or more plumbing fixtures shall have a nominal diameter at least equal to the piping.

2.3.3 Hot and Cold Water

2.3.3.1 Ball Valves

4" and smaller. Two or three piece bronze body, full port, blow out proof stainless steel stem, brass ball with hard chrome plating, TFE seat rings,

plated steel handle.

2.3.3.2 Check Valves

3" and smaller. Bronze body horizontal swing, Buna-N disc, stainless steel pin and lever.

2.4 INSULATION

2.4.1 General

The work covered by this specification consists in furnishing all labor, equipment, accessories and materials and in performing all operations necessary for the installation of all insulation for the plumbing piping systems. Insulation shall be installed in strict accordance with the insulation section of this specification and applicable drawings, subject to the terms and conditions of the contract. All insulation shall be installed in a workmanlike manner by skilled workmen regularly engaged in this type of work. Insulation shall be Johns-Manville, Armstrong, Fiberglass, Knauph, or products of equal quality and performance.

2.4.1.1 Fire and Smoke Hazard Ratings

All insulation shall have composite (insulation, jacket, or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM C84, NEPA 225, and UL 723 not exceeding: Flame spread 25; Smoke developed 50; fuel contributed 50; UL fire hazard classification 1. Accessories, such as adhesives, plastics, cements, taps or glass fabric for fittings shall be the same component ratings as listed above.

2.4.1.2 Thickness

Insulation thickness specified herein is based on a conductivity of .22 BTU/SQ.Ft/Deg. F/HR. at 75 degrees F. mean temperature. If insulating materials with substantially different thermal properties are used the thickness of insulation shall be adjusted to provide the overall insulating efficiency of the material specified.

2.4.1.3 Vapor Seal

Insulation on all cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces must be adequately insulated and vaporsealed to prevent condensation.

2.4.1.4 Openings

All insulation shall be continuous through walls and ceiling openings and sleeves where applicable.

2.4.1.5 Preformed Pipe Insulation

Preformed pipe insulation shall be two-piece or one-piece fiberglass

composite with vinyl coated embossed vapor barrier laminate and pressure sealing lap similar to Owens Cornings Fiberglass 25ASJ or Johns-Manville A.P. The insulation systems shall be suitable for piping operating between 50°F to 450°F. The insulation system shall be vermin-proof, rot-free, non-shrinking with a moisture absorption not exceeding .2% by volume after 96 hours at 120°F and 95% RH. Jacket permanence shall not exceed .2% perms and shall have a Beach puncture rating of at least 50 units.

2.4.1.6 Fittings, Valve Bodies, and Flanges

Fittings, valve bodies and flanges for pipe sizes 6 inch and smaller shall be finished with fiberglass inserts and PVC fitting covers. One (1) insert to be used for pipe insulation of 1 inch thickness. An additional insert to be used for each additional 1 inch or fraction thereof for pipe insulation above 1 inch thickness.

2.4.1.7 Pipe Expansion

Make adequate provisions for expansion of piping. Unions to be left uncovered and clean. Finished surfaces of insulation are to be suitable for painting.

2.4.2 Insulation Protection

2.4.2.1 High Moisture

Insulation exposed to high moisture of interior areas shall be encased with 15 mil. vinyl film.

2.4.2.2 Weather Exposure

Insulation exposed to weather shall be encased with 20 mil. vinyl film.

2.4.2.3 Joints

All joints sealed as recommended by manufacturer.

2.4.3 Domestic Water Piping

2.4.3.1 Cold Water Above Ground

Cold water above ground shall be insulated with 1 inch thick fiberglass insulation with ASJ jacket.

2.4.3.2 Hot Water Above Ground

Hot water above ground shall be insulated with 1 inch thick fiberglass for sizes through 3 inch pipe and 1-1/2 inch thick fiberglass for sizes greater than 3 inch and with ASJ jacket. See hot water maintenance systems recommendations.

2.4.3.3 Water Under Ground

Hot and cold water underground shall be insulated with 1/2 inch thick

plastic foam.

2.4.3.4 Concealed Water

Hot and cold water piping concealed in walls or pipe chases may be insulated with 1/2 inch thick plastic foam.

2.4.4 Water Storage Tank

All surfaces shall be insulated with three pound density fiberglass board equal to Owens Corning #703 using 2 inch thickness. Insulation shall be cut, scored or mitered to fit the contour of equipment with edges tightly butted and secured with #18 galvanized hexagonal mesh wire and heavy coat of mineral fiber cement over insulation. Finish with 6 oz. canvas jacket applied with suitable adhesive. This contractor shall provide insulation on equipment furnished by him only unless otherwise specified. Break insulation at access panels, handholes, equipment, joints, etc.

2.5 PLUMBING SPECIALTIES

2.5.1 Traps

Every fixture and floor drain shall be provided with a proper trap placed near the outlet and properly vented. Traps shall be cast iron hub and spigot where used in soil pipe or nohub with approved stainless steel couplings. Traps for threaded pipe shall be screwed drainage pattern cast iron "P" traps. Where approved, PVC traps with adjustable compression fittings may be used. All exposed traps for sinks, lavatories and similar fixtures shall be chrome plated "P" traps, or as specified with the fixture trim. All traps shall have a minimum seal of 2 inch.

2.5.2 Cleanouts - Floor

- (1) Based on product by Zurn
- (2) Cleanouts of equal quality by Wade, Sioux Chief, Josam or Ancon are acceptable.
- (3) Cleanout shall be set flush with floor.
- (4) Covers shall be round or square scoriated nickel bronze.
- (5) All cleanouts shall be full size of the pipe it serves thru 6" and 6" for sizes 8" and larger.
- (6) Cleanouts Floor.
- c.o. 1 Zurn Z-1400NH or NL, gasketed seal bronze or PVC plug (light to medium traffic).

2.5.3 Cleanouts - Wall Access

(1) Based on product by Sioux Chief Products Co.

- (2) Wall access plates of equal quality by J.R. Smith, Wade, Josam, Ancon, and Zurn are acceptable.
- (3) Wall access covers shall be heavy duty round stainless steel for size 5-1/2" diameter thru 8-1/2" diameter and standard duty round stainless steel for diameters 10-1/2" and 12-1/2".
- (4) Each wall access cover shall be secured to wall by a tapped, behind the wall, bar and a chrome plated threaded bolt.
- (5) Sioux Chief wall access covers $\#SS-1015\ HD$, SS-1016HD, SS-1018HD, SS-1010 and SS-1025.

2.5.4 Floor Drains

(1) Provide and install floor drains where shown and size indicated on the drawings of the type listed below. Floor drains shall be set level and at the proper elevation to drain the surrounding floor area. All floor drains set in floors above habitable space shall be equipped with 4# per square foot sheet lead safing or approved vinyl type extending a minimum of 18 inches beyond rim of floor drain in all directions. Based on product by Zurn.

Ventonite, Inc. - Atlanta, Georgia. ACD Pourable Underlayment, International, Inc. - Pittsburgh, PA Ardex V-800, Levelcrete by Ardex, Inc. - Pittsburgh, PA Latex Cement by Master Builders/Martin Marretta - Cleveland, OH

FD-1 Floor Drain Zurn ZN-415 w/Type B Strainer

Cast iron body, reversible clamping collar for high or low setting, round nickel bronze adjustable strainer. Strainer diameter shall be 5" for 2" outlets, 6" for 3" outlets thru 8" for 4" outlets.

Floor Drains of equal quality by Wade, Josam, Ancon or Smith are acceptable.

2.5.5 Water Hammer Arrestors

- (1) Provide water hammer arrestors on hot and cold water piping where shown on drawings.
- (2) Water hammer arrestors shall be sized and located in accord with the hydraulic design of the piping system served and to the manufacturer's recommendations.
- (3) Mechanical water hammer arrestors shall be accessible.
- (4) Arrestors manufactured by J.R. Smith, Wade, Josam, Zurn, Sioux Chief or Precision Plumbing Products are acceptable.

ARRESTOR SIZING TABLE

P.D. I. Ur	its Fixture	Units Pl	lan Symbol
А	1	-11	"A"
В	12	-32	"B"
C	33	-60	" C "
D	61-	113	"D"
E	114-	154	"E"
F	155-	330	"F"

2.5.6 WH-1 Wall Hydrants

Provide and install where shown on the drawings Woodford Model #67 automatic draining freezeless wall hydrant with chrome plated finish, removable "T" handle key, vacuum breaker and anti-siphonage outlet (ASSE #1052). Seal hole through all around hydrant with grout or caulking to make water tight and air tight. Provide stop and waste valves in lines preceding all hydrants. Wall hydrants equal in quality by J.R. Smith, Josam, Wade or Zurn are acceptable.

2.5.7 Thermometers

Provide thermometers in water systems for monitoring system. Thermometers shall be industrial grade with 9 inch aluminum case, black finish, aluminum stems, 2-1/2 inch insertion, clear acrylic window, red indicator on white scale, and brass well socket. Thermometers shall be adjustable type with range as best suited to application. Mount thermometers in a position so as to be visible from a convenient floor location. Instruments shall be Trerice Series A005. Enrst Gauge Co. or Crosby are acceptable. Provide thermometers in the following locations:

1. Water heaters in hot building supply.

2.5.8 HB-1 Hose Bibb

Woodford Model 26, 3/4" chrome plated brass faucet with loose key handle and vacuum breaker (ASSE 1052) with 3/4" male hose thread, or equal product.

2.6 EQUIPMENT

2.6.1 Electric Water Heaters

See Schedule for size and characteristics. Heaters shall be glass lined steel, tested under 125 psi hydrostatic pressure prior to lining, and provided with anodic protection, external drain valve and ASME rated temperature and pressure relief valve. Heating elements shall be direct immersion type, heavy duty, Incoloy sheathed, low voltage density (75 watts per square inch) of capacity and arrangement as scheduled. Controls shall include contactors, adjustable thermostats and high limit thermostat (set point 205°F.). Tank shall be insulated with polyurethane foam insulation with a minimum R-value of 16. The entire unit shall be U.L. approved and labelled. Heater by Rheem, Lockinvar, A.O. Smith, or State Industries are acceptable.

2.6.2 Water Storage Tank

Tank shall be a bladder type tank as shown on the drawings. Contractor shall coordinate pre-charge pressure with tank manufacture.

Provide unions, ball valves, bypass piping, and drain valve as per detail shown. Insulate exterior of pressure tank as per specifications.

2.6.3 Water Heater/Storage Tank Safety Devices

2.6.3.1 Storage Type Water Heaters and Tanks

All pressurized storage-type water heaters and unfired hot water storage tanks shall be equipped with one or more combination temperature and pressure relief valves. The temperature steam rating of a combination temperature and pressure relief valve or valves shall equal or exceed the energy input rating in BTU per hour of the water heater. No shut off valve or other restricting device may be installed between the water heater or storage tank and the combination temperature and pressure relief valve.

2.6.3.2 Non-Storage Type Water Heaters

All pressurized non-storage type water heaters shall be provided with a pressure relief valve installed at the hot water outlet with no shut off valve between the heater and the relief valve.

2.6.3.3 Temperature and Pressure Relief Valves

Temperature and pressure relief valves shall be installed so that the sensing element of the valve extends into the heater or tank and monitors the temperature in the top 6 inches of the heater or tank.

2.6.3.4 Relief Valve

- (1) Every relief valve which is designed to discharge water or steam shall be connected to a discharge pipe.
- (2) The discharge pipe and fittings shall have a diameter not less than the diameter of the relief valve outlet.
- (3) The discharge pipe may not be trapped.
- (4) No valve may be installed in the discharge pipe.
- (5) The discharge pipe shall be installed to drain by gravity flow to a floor served by a floor drain. The outlet of the discharge pipe shall terminate within 6 inches over the floor or receptor, but not less than a distance equal to twice the diameter of the outlet pipe. The outlet of the discharge pipe may not be threaded.
- (6) The discharge pipe for a water heater shall terminate within the same room or enclosure within which the water heater or hot water storage tank is located.

2.6.3.5 Safety Devices

- (1) Relief valves shall be listed by the American Gas Association, Underwriters Laboratories, Inc. or American Society of Mechanical Engineers when the heat input to a water heater is less than or equal to 200,000 BTU per hour.
- (2) Relief valves shall be listed by the American Society of Mechanical Engineers when the heat input to a water heater exceeds

200,000 BTU per hour.

- (3) Pressure relief valves shall be set to open at either the maximum allowable working pressure rating of the water heater or storage tank or 150 psig, whichever is smaller.
- (4) Temperature and pressure relief valves shall be set to open at a maximum of 210° F. and in accordance with subpar. f.3).

2.7 FIXTURES AND TRIM

This section of the work includes plumbing fixtures furnished and installed by the Contractor.

2.7.1 Vitreous China Fixtures

All vitreous china fixtures shall be of the best quality conforming in all respects to classification "Regulation Selection" in accord with the uniform grading rules of "Vitreous China". Fixtures to be "roughed-in" in accord with manufacturer's dimensions. All fixtures shown on the drawings and/or specified herein shall be set firm and true, connected to all the piping services required and ready for use without the offsetting of supplies. Equipment shall be suitably protected against damage before and after installation. Any damaged plumbing fixture or piece of equipment shall be replaced at the expense of the plumbing contractor. All fixtures to be acceptable for final inspection shall be free of chips, flaws, scratches, abrasions, discolorations or any defect which, in the opinion of the Contracting Officer would classify the fixture as unsuitable for use intended.

2.7.2 Exposed Trim

All exposed trim including pipe nipples to plumbing fixtures shall be chromium plated and shall be completely free of tool marks, abrasions, or flattening of tubing, etc. All fixtures included in this specification and shown on the drawings shall be completed by the plumbing contractor together with all necessary hangers, bolted, anchors and brackets.

2.7.3 Fixture Location

All fixture heights, spacing apart and distances from walls shall be in accordance with Architectural details (floor plans and elevation). Deviation may necessitate alteration to comply with plans. Verify dimensions with General Trades. All fixtures shall be set level.

2.7.4 Water Flow

Repair all leaks, dripping faucets, etc. Regulate flow to water closets, showers, etc., for proper operation. Provide shutoffs at all individual fixtures.

2.7.5 Fixtures and Trim

Fixtures and trim of equal quality as listed by other manufacturers may be

submitted.

2.7.6 Fixture Support

Fixture support. Provide and install proper supports and carriers for plumbing fixtures as scheduled or required for the application. Carriers shall be set in accordance with manufacturer's recommendations with adequate anchors and fasteners to provide required support. Wall hung water closet outlets shall be fully grouted for support in masonry walls.

2.7.7 Caulk

Caulk around all plumbing fixtures.

PLUMBING FIXTURES

PLUMBING FIXTURES

WC-1 Water Closet (ADA	Water Closet (AI	OA)
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Kohler K-4330 Crane 3-446E

Vitreous china elongated bowl siphon jet rear American Standard 2257.103 outlet water closet with top spud. Rim 18" A.F.F. Provide fixture carrier.

Flush Valve:

Sloan Regal 111 or Sloan Aquavantage Delany 402-1

Exposed chrome plated flush valve for 1.6 Royal Zurn Z-6000XL-WS1 or gallon flush, quiet action with screw-driver stop, vacuum breaker, escutcheon and spud flange.

Seat: Bemis No. 1955-C Beneke 523 Kohler K-4670-C Olsonite 10-CC

Extra heavy white solid plastic open front seat with check hinge for elongated bowl.

Carrier: Zurn 1203/1204 Series Wade J.R. Smith

No hub, horizontal/vertical, siphon jet carrier. Right or left hand, double/single to be determined by Plumbing Contractor.

Note: As per ADA code, flush handle must be located on open accessible side of stall.

PLUMBING FIXTURES

WC-2 Water Closet

Kohler K-4330

Crane 3-446E

Vitreous china elongated bowl siphon jet rear American Standard 2257.103 outlet water closet with top spud. Rim 15" A.F.F. Provide fixture carrier.

Flush Valve:

Royal

Zurn Z-6000XL-WS1 or

Aquavantage Delany 402-1

Sloan Regal 111 or Sloan Exposed chrome plated flush valve for 1.6 gallon flush, quiet action with screw-driver stop, vacuum breaker, escutcheon and spud flange.

Seat:

Bemis No. 1955-C Beneke 523 Kohler K-4670-C

Olsonite 10-CC

Extra heavy white solid plastic open front seat with check hinge for elongated bowl.

Carrier:

Zurn 1203/1204 Series

Wade

J.R. Smith

No hub, horizontal/vertical, siphon jet

carrier. Right or left hand, double/single to

be determined by Plumbing Contractor.

U-1 Urinal (ADA)

Kohler K-4960-T Vitreous china, wall hung, washout urinal with

Crane 7-197E

American Standard 6501.010 3/4" top spud and 2" outlet and removable

beehive strainer.

Mansfield 475 (Note: #410 not state approved, use #475)

Flush Valve: Sloan Royal 186-1 Zurn Z6003XL-WS1

Delany 451-1

3/4" chrome plated level operated quiet action

flush valve with vacuum breaker, 3/4" screwdriver operated angle stop and 1/2" supply pipe to the fixture with chrome plated cast brass escutcheon. One gallon flush

maximum

Carrier:

Wade: W-452 J.R. Smith 637 Floor mounted single carrier with hanger plate, steel upright and block bases.

Note: Mounting height at 17" AFF to rim of urinal fixture.

PLUMBING FIXTURES

L-1 Lavatory (ADA)

Integral with countertop

See SECTION 06200: FINISH CARPENTRY.

Faucet: Zurn Z-86500 Chicago 802A-665 Chrome plated brass faucet, 4" spout, slowclosing metering cartridge handles, 0.25 G.P.M. vandal resistant with 4" centers. Easy adjustable cycle time, preset to 10 seconds at 80 psi. 1/2" coupling nuts for standard lavatory risers.

Drain: EBC SG7WC McGuire 155WC

Keeney 5700PC

Offset lavatory drain with perforated strainer with 1-1/4" tailpiece.

Supplies: EBC LA-16

Brass Craft OCR-1912-AZC

McGuire 2165-CC

1/2" compression chrome plated cast brass angle stop with brass stem and wheel handle, chrome plated flexible copper tube riser and chrome escutcheon.

Trap: EBC-TA140 McGuire 8902 Keeney 311XPC

1-1/4" x 1-1/2", 17 gauge, ground joint, polished chrome tube "P" trap and escutcheon.

Insulation Kit:

Brocar Products C500 RHS McGuire PW 2000 WC

Truebro #102 w/105 Accessory Handicap lavatory P-trap and angle valve assemblies shall be insulated with white color fully molded insulation kit.

SS-1 Service Sink E.L. Mustee 63M Fiat MSB-2424 Zurn 24

 $24" \times 24" \times 10"$ deep resin bonded white with black accents one piece mop basin with 3" cast brass drain body, dome strainer/lint basket. Provide 3" neoprene gasket 3 place mop hanger, vinyl bumper guard and silicone sealant. Provide 12" x 24" stainless steel wall panels and seal around basin at top of basin and wall panels.

Faucet: Zurn Z-841M1 Chicago 897 T&S Brass B-0667-POL Kohler K-8904

Polished chrome plated brass exposed wall mount service sink faucet with threaded spout, pail hook, wall bracket and loose key or integral stops. Install Watts No. 8A chrome plated vacuum breaker on threaded spout. Provide 36" long hose kit. Install faucet at 36' AFF.

PLUMBING FIXTURES

DF-1 Drinking Fountain

Elkay EDFP-117-C Halsey-Taylor OVL-II-SEBP

Haws 1114

Oasis MLFMRSL

Two level lead-free, wall mounted, stainless steel fountain with wall plate and safety bubbler.

Supply: 1/2" compression chrome plated cast brass EBC VA-16 angle stop with brass stem, wheel handle and

Brass Craft OCR-1412-AZC chrome escutcheon.

Trap:

EBC TA140 Chrome plated 1-1/4" x 1-1/2", 17 gauge ground

McGuire 8902 joint "P" trap.

Keeney 311XPC

Note: Mounting heights (see Detail).

2.9 CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

This contractor shall rough-in and make final connections to all items of equipment as shown or scheduled. Equipment shall be unloaded, assembled and set in place by persons furnishing equipment. Rough-in drawings shall be furnished to the plumbing trade by the equipment supplier immediately after contract is let to assure proper rough-in locations.

PART 3 EXECUTION

3.1 Execution

3.1.1 Workmanship

All work shall be done by qualified licensed plumbers that are knowledgeable and experienced in the operations they are performing. Fabrications and installation methods, procedures and materials shall be in accordance with accepted industry practice and with the standard of manufacturing and contracting associations applicable to the work. All work shall be neatly done with special emphasis on the appearance of work exposed to view. All piping shall be run plumb and square unless otherwise required for a functional reason. Gradients of pitched lines shall be continuous.

3.1.2 Painting

Furnish all equipment completely finished unless specifically noted otherwise. Touch up all abrasions, nicks, scratches or other paint defects to restore equipment to its original condition. Severely marred equipment shall be factory refinished if so desired by Contracting Officer. Clean all surfaces to make them suitable for painting, on all equipment furnished, which are to be painted by other.

3.1.3 Excavation and Backfill

(1) Refer to Section 02200, Division 2 "Earthwork" which is

applicable; especially note references to "Site Information, Protection, Excavation, Unforeseen Obstacles, Filling and Grading, Compaction Tests, Disposal of Excess and Waste Materials, Dewatering, Etc.

- (2) Contractor shall perform all excavation required for related underground piping inside building and for all exterior underground piping. Include all necessary clearing of excavated area, and all trenching, tunneling, sheet piping, shoring, underpinning, pumping, bailing, transportation of earth, fill and backfilling.
- (3) Reference is made to the Working Drawings for subsurface soil data, contours, site conditions, etc.
- (4) Excavate whatever material is encountered to depth required. Excavation shall extend one foot out from each side of pipe. Bottom of trench or excavation shall be level and solidly compacted to assure firm foundation.
- (5) All excavated materials shall be removed from site or deposited as directed by the Contracting Officer.
- (6) Protect excavation from caving or washing and erect necessary barricades, complying with regulations set forth in EM 385-1-1 Safety and Health Requirements Manual, U.S. Army Corps of Engineers.
- (7) Lay all pipe in open trenches unless Contracting Officer gives written approval for tunneling. Trenches for sewers and water shall have a minimum of 8 feet of space between each service. All underground piping shall be supported on a bedding of sand or granular material at least 4 inches thick.
- (8) Backfill with sand to one foot above top of piping and thoroughly compacted with earth free of cinders, stones and debris. Remove forms, shoring, etc., as backfill is placed. All backfilling under footings must be compacted within 8 feet of all footings.
- (9) When running a pipe below a footing and parallel to it, same shall in all cases be at least one foot greater in distance away from footing than below its bottom. Where possible, run lines at center point between two parallel footings and maintain above mentioned distances at minimum. When running under a footing, disturb as little of the soil under footing as possible. Provide concrete fill under all footings where excavations wider than 18 inches are required.
- (10) Backfilling shall not be placed until the work has been inspected, tested and approved.
- (11) Concrete, asphalt or gravel paved areas, sidewalks, curb, gutters and lawn areas which are disturbed shall be replaced and restored to original condition by Contractor unless specifically stated to the contrary.

3.1.4 Cutting and Patching

Skilled tradesmen shall be employed to do cutting and patching. Each trade shall be responsible for cutting and patching new openings for their use, in existing or previously constructed walls, ceilings, floors, roofs, etc., unless otherwise designated. Provide personnel protection under coring operations in occupied areas. Submit methods of supporting and sealing floor sleeves for approval. Holes cut in roof and exterior wall shall be weatherproofed immediately. Provide temporary dust barriers for cutting operations in occupied spaces. Refer to Architectural drawings for lintels provided by General trades. When lintels are not indicated in other division of the work, they shall be provided by the trade requiring the opening. All piping penetrations through masonry structure shall be drilled or core drilled. All penetrations for access panels, etc. shall be saw cut before removal. Jack hammering without saw cutting is prohibited.

3.1.5 Access

All plumbing fixtures and/or equipment shall be located so that parts requiring service and/or adjustment, fixture traps and valves shall be readily accessible. Provide access doors or panels to make service convenient. Doors by Milcor or as per architectural specifications.

3.1.6 Equipment and Piping

Below 7'-6" above finished floor shall have a resilient material (foam rubber, etc.) attached to all potentially dangerous edges.

3.2 SLEEVES AND INSERTS

- (1) At all fire rated penetrations only use UL listed, tested, and approved materials and methods.
- (2) All pipes passing through masonry walls, floors, ceilings or partitions shall be provided with sleeves having internal diameters at least 1/4 inch greater than the outside diameter of uninsulated pipes and/or outside diameter of the insulation of insulated piping. Sleeves for pipes passing through fire rated floor slabs and fire rated walls shall be schedule 40 steel pipe extending 1 inch above the finished slab and sealed. If holes must be cut through finished construction they must be core drilled to avoid damage to construction. Exterior wall sleeves shall be caulked weathertight. Sleeves through equipment room also shall be filled with glass fiber insulation. Where chases are formed for passage of several pipes, they shall have a 1 inch high curb above finished slab and sealed. Whenever sleeves occur as penetrations of rated construction, the void space shall be sealed with U.L. rated foam sealant similar to Chase Foam, CTC PR855; 3M Fire Barrier Caulk CP25 and putty 303; Dow Corning Fire Stop 2000 or Specified Technologies, Inc. Spec Seal Firestop Products installed in strict accordance with the manufacturer's instructions. Use sealant thickness as required to provide the full fire protection rating of the structure. Insulation shall not pass through rated assemblies. Insulation shall butt tight against the rated assembly after the sealant is installed and inspected.

- (3) Inserts in floor slabs shall be galvanized individual type with accommodation for removable nuts and threaded rods up to 3/4 inch diameter, permitting lateral adjustment. Any fastener in a beam shall be midway above the bottom of the beam.
- (4) Piping that passes through outside walls below grade and above grade shall be permanently sealed with a water-tight rubber compression seal between the pipe and the sleeve equal to Link-Seal modular wall and casing seal as manufacturer by Thunderline Corporation. The pipe sleeve and seal must meet UL listed, tested, and approved materials and methods.

3.3 MOUNTING PADS

Floor mounted mechanical equipment shall be set on reinforced concrete pads 4 inches high and extending 4 inches beyond the equipment base on all sides. See drawings for specific requirements.

3.4 IDENTIFICATION

- (1) Identify all mechanical equipment with nameplate bearing equipment name and number, using 1-1/2 inch white bakelite with 1/2 inch black letters permanently mounted in a conspicuous place. Use mechanical fasteners instead of adhesive to mount nameplates wherever possible.
- (2) Each piping system furnished and installed shall be identified. The direction of flow shall be identified by means of stenciled legends and flow arrows. The marking shall be applied after all painting and cleaning of the piping and insulation is completed and before ceilings are installed. Marking shall be in accordance with EM 385-1-1 and ASME A 13.1 1996 "Scheme for Identification of Piping Systems".
- (3) The legend and flow arrow shall be applied at all valve locations at all points where piping enters or leaves a wall, partition, bulkhead, cluster of piping, or similar obstruction and at approximately 30 foot intervals on pipe runs with at least one in each space or room. Color shall be black with stencils sized as follows: Over 2" -1" high; 2" under 1/2" high. The marking shall be located so as to be conspicuous and legible at all times from any reasonable point. Install markings before ceilings are installed.
- (4) Valve Identification. Valve charts shall be provided for each piping system which shall identify each valve with a numbered 1-1/4 inch round brass metal tag, stating valve number, valve location and describe valve function. Upon completion of the project, provide two copies of each chart enclosed in a glass front metal frame and shall be mounted in the mechanical room in a place as directed by the Contracting Officer. Tags shall be attached with metal "S" hooks or by metal chain. Tags shall be equal to Seton #2960. Provide valve identification charts in each Government's service and maintenance manual. Identification Symbols as follows:

DCW Domestic Cold Water

DHW Domestic Hot Water

(5) Concealed Valves and Equipment Identification. All valves, controls, or other equipment requiring service located above removable ceilings, shall have the ceiling tile directly below identified with a colored tack inserted into the tile or a colored sticker applied to grid system designating a valve above.

ESCUTCHEONS 3.5

- (1) Escutcheons shall be installed on all exposed pipes wherever they pass through floors, ceilings, walls, or partitions.
- (2) Escutcheons for pipes passing though floors in unfinished areas shall be split hinged type designed to fit the pipe and to cover the projecting pipe sleeve. Escutcheons for pipes exposed to view in finished areas shall be chrome plated brass.
- (3) Escutcheons shall be properly sized to fit snugly around the pipe and shall be sized to completely cover the wall or floor opening.

3.6 TESTS AND ADJUSTMENTS

The Contractor shall conduct tests of systems as required by codes, regulatory agencies and this specification. Tests shall be made with the medium and under pressure as stated in the test requirements. Notify the Contracting Officer and/or regulatory agencies prior to conducting tests. The Contractor shall complete the attached certification form and submit to the Contracting Officer when tests have been completed and include in O&M Manuals.

3.6.1 Tests

Type of System Gauge Pressures Test Medium

> (lbs. per sq. inch, or vacuum in inches)

and Stacks of Sanitary, Storm or Clear Water Piping Systems

Building Sewers, Building Minimum of 10 foot head Drains, All Branches, Vents on each joint for a minimum Water of 15 minutes with no head loss.

> Uniform gauge pressure of Air 3 psi for a minimum of 15 minutes without adding air.

Water

- a) Service and Bldg. 100 psi gauge pressure Water Distribution Piping. for a 2 hour period
- (1) The pressure in pounds per square inch, or inches of vacuum,

gauge, are given as an initial pressure to be applied to lines being tested, together with test medium. Tests are to be applied for a minimum period of four (4) hours and until tests are complete. Final pressures at the end of test period may vary only by that caused by expansion of the test medium due to temperature changes.

(2) Check of systems during application of test pressures should include visual check for water medium leakage, soap bubble or similar for air and nitrogen medium.

3.6.1.1 Start Up of Piping Systems

Potable water system shall be cleaned and disinfected in accordance with state and local codes or in the absence of such codes shall be treated by accepted methods to provide a system free of harmful contaminants and acceptance to regulatory agencies. All lines shall be thoroughly flushed to remove dirt and construction debris.

3.7 REQUIREMENTS FOR SUBSTANTIAL COMPLETION

3.7.1 Cleaning Equipment and Premises

- (1) Thoroughly clean all parts of the piping, valves and fixtures. Exposed parts which are to be painted shall be thoroughly cleaned of cement, plaster and other materials and all oil and grease spots removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out. Exposed metal work shall be carefully brushed down with steel brushes to remove rust and other spots and left smooth an clean.
- (2) Remove all construction debris, excess materials and equipment.
- (3) Caulk around all plumbing fixtures at walls and around base of water closets, service sinks, etc.

3.7.2 Operating and Maintenance Manuals

3.7.2.1 Manuals

The Contractor shall furnish to the Contracting Officer five operating manuals for furnished equipment. Information sheets shall be bound in standard 3-ring binders labeled to show the contractor's name, address, regular business phone number, emergency phone number and date. Operating manuals shall be submitted prior to completion of the work to allow time for review. The manual shall contain the following information:

- (1) The Certification of Tests and Adjustments completed and signed.
- (2) A list (keyed with identification numbers used) of each item of equipment, which required service giving the name of the item, model number, manufacturer's name and address and the name address and phone number of the nearest representative or authorized service organization.

- (3) A copy of the approved shop drawing for each item.
- (4) A complete operating and maintenance manual with parts listed, wiring diagrams, lubrication requirements, and service instructions for each major item including faucet and mixing valve repair.
- (5) Complete control diagrams with description of all operating sequences and control devices.
- (6) Properly executed and registered manufacturer's warranties.
- (7) A copy of valve chart.

3.7.2.2 Training

- (1) Provide a minimum of 2 hours training on operations of major equipment with Government maintenance staff.
- (2) Contractor to provide training on the proper methods of winterizing a seasonal building.

3.8 PENETRATIONS OF FIRE RESISTIVE ASSEMBLIES

Plumbing piping systems that penetrate fire rated assemblies shall be installed in accordance with current Minnesota Plumbing and HVAC Code and U.L. or current acceptable methods. Also refer to requirements for sleeves.

3.9 ATTACHMENTS

- (1) Certification of Tests and Adjustments Plumbing
 - -- End of Section --

CERTIFICATION OF TESTS AND ADJUSTMENTS - PLUMBING

Plumbing Trade Name:								
Project Name								
Project Number								
The Plumbing Trade named above certifies that the tests and adjustme indicated below have been completed in accordance with the specifications on the date indicated.	nts							
TESTS	DATE							
Building Sewers, Building Drains, Branches, Vents and Stacks								
Sanitary Waste and Vent								
Water: 1) Building Service								
2) Building Distribution								
Start-up of Piping System and Pumps								
Flushing and Disinfection of Potable Water System _								
Training Government on Methods of Winterizing a Seasonal Building								
Contract								
Signed By Plumbing Contractor								
Date								
Signed By Project Manager								
Date								

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SECTION 15500

HEATING AND VENTILATING SYSTEMS 06/02

PART 1 GENERAL

1.1 SCOPE

This section covers heating and ventilation systems, ductwork, dampers, and louvers for the pump control buildings and restrooms.

1.2 RELATED WORK OF OTHER SECTIONS

Refer to the following for work related to this section:

1.2.1 Pump Work

SECTION 15161: ELECTRIC PUMPING EQUIPMENT

1.2.2 Electrical Wiring

SECTION 16250: ELECTRICAL WORK

1.2.3 Louvers, dampers and ductwork

SECTION 16264: DIESEL GENERATOR INSTALLATION.

1.2.4 Restroom Equipment

SECTION 15400: PLUMBING.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

Air Moving and Conditioning Association Inc. (AMCA)

AMCA 210 (1985) Laboratory Methods of Testing Fans for Rating

American Society for Testing and Materials (ASTM)

ASTM A 167 (1996) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

ASTM A 525 (1993) Steel Sheet, Zinc-Coated

(Galvanized) by the Hot Dip Process

ASTM C 533 Test Method for Peel Strength of Metal

Electroplated Plastic Surfaces

American Welding Society (AWS)

AWS D1.1 (1996) Structural Welding Code

National Fire Protection Association (NFPA)

NFPA 70 (1996) National Electrical Code (NEC)

Sheet Metal and Air-Conditioning Contractors' National Association Inc. (SMACNA) Standards

SMACNA Duct Standards (1985) HVAC Duct Construction

Standards-Metal and Flexible

SMACNA Systems Testing (1983) HVAC Systems-Testing, Adjusting,

and Balancing

1.4 SUBMITTALS

Shop drawings shall be provided for all equipment and materials. Submittals shall include manufacturer's descriptive and technical literature, performance charts, and catalog cuts. Drawings shall indicate clearances required for maintenance and operation. The shop drawings listed below shall be submitted.

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Heating Equipment Data; GA

Provide manufacturer's bulletins, catalog cuts, etc. on the heating equipment supplied under this contract. Rating, control information, physical dimensions, etc. shall be given.

SD-01 Data

Exhaust Fans Data; GA

Provide data on the exhaust fans to be supplied. Include information on horsepower, speed, air quantity, fan type sound power level, and wiring data. Show all installation information and procedures including roof curbs.

SD-01 Data

Louvers and Dampers Data; GA

Provide information on louvers, motorized dampers, and gravity dampers. Include size, rating, and material. Installation details for ductwork shall be provided. Include support details, size, and gauge. All louvers, motorized dampers, ductwork and controls associated with the engine generator shall be coordinated with the Government Furnished engine generator to verify the proper sizing of this equipment with the engine generator set to be installed. Computations that prove this sizing for air flow, free area and pressure drop shall be provided.

SD-01 Data

Spare Parts Data; FIO

Provide spare parts data. - The Contractor shall provide a list of recommended spares for all equipment supplied.

SD-04 Drawings

Heating and Ventilating Systems Drawings; GA

Provide shop drawings on the installation of the heating and ventilating systems. All support details shall be shown. Wiring diagrams for the unit heaters and fans shall be provided.

SD-09 Reports

Balancing Reports; FIO

Provide any balancing reports for the exhaust systems installed, if required.

SD-09 Reports

Performance Test Reports; FIO

Upon completion and testing of the installed system, test reports shall be submitted in booklet form showing all field tests performed. Performance test reports shall be included in the operation and maintenance manual.

SD-19 Operation and Maintenance Manuals

Operating and Maintenance Instructions and Manuals; FIO

Operating and Maintenance Instructions. The Contractor shall incorporate all as-built and service information on heaters, fans, and dampers into the operation and maintenance manual specified in SECTION 15161: ELECTRIC PUMPING EQUIPMENT. This information shall be provided in a separate section in the manual. A supplement covering equipment installed in the restrooms shall be supplied for incorporation into the manual required in SECTION 15400 PLUMBING.

Operation and maintenance information shall include troubleshooting and diagnostic data, routine service information, wiring diagrams, and parts data. A source for parts and service shall be provided. A description and write up of the control systems shall be included.

1.5 GENERAL REQUIREMENTS

1.5.1 General

The drawings indicate the extent and general arrangement of the heating and ventilating systems. Contractor shall be responsible for installing the system per applicable local codes.

1.5.2 Standard Procedures

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. Heaters, exhaust, and dampers shall be from a standard catalog line distributed by the manufacturer.

1.5.3 Asbestos Prohibition

Asbestos and products containing asbestos shall not be used.

1.5.4 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment. Plates shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

1.5.5 Instruction Plates

As necessary, each item of equipment shall be equipped with suitably located instruction plates, including warnings and cautions describing any special and important procedures to be followed in starting, operating, and servicing the equipment. Plates shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

1.5.6 Verification of Dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contraction Officer of any discrepancy before performing any work.

1.5.7 Underwriters Laboratory

Electrical appliances and equipment supplied shall meet the Underwriters Laboratory requirements regarding fire and casualty hazards. The label or listing by the Underwriters Laboratory will be accepted as proof of conforming with this requirement.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials and equipment shall meet the requirements of publications and requirements listed below and indicated on the schedules at the end of this section.

2.1.1 Fans

Fans shall be tested and rated in accordance with AMCA 210. Fans may be directly connected to the motor shaft or indirectly connected to the motor by means of a V-bet drive. V-belt drives shall be designed for not less than 150 percent of the connected driving capacity. Fan and motor assemblies shall be provided with vibration isolation supports.

2.1.1.1 Wall Mounted Exhaust Fans

Wall exhaust fans shall be of aluminum for housings and provided complete with mounting flanges for attachment to the wall. Exhaust fans shall be propeller type, with sizes to provide a minimum 3000 cfm for sump exhaust and 2100 cfm for operation room exhaust and of the location and configuration indicated on the drawings. Fans shall constructed with motor isolated from the exhaust stream. Motor shall be rated for continuous duty. Wall mounted exhaust fans shall be similar or equal to Greenheck Industries, Schofield, WI 54476.

2.1.1.2 Exhaust Fans (Restroom)

1) Provide and install ducted exhaust fan with external bracing, and 12/5 roof pitch base. CFM rating of 100 shall be provided at a static pressure of .5 W.G.

2.1.2 Heaters

Heaters shall be rated as shown on the drawings and shall be UL approved. Housing shall be heavy gauge, cold-rolled steel with a factory baked enamel finish. Heaters shall be wall mounted. Heaters shall be similar or equal to Chromalox Model LUH-07-43-32 (pump stations) or LUH-05-21-34 (restrooms).

2.1.3 Thermostat

Unit heaters shall be controlled by a remote thermostat which is wall mounted as shown on the drawings. Thermostat for the unit heaters shall be line voltage, heavy duty with SPDT switch rate at 16.0 amps at 120 VAC and 40 to 90 degrees F temperature range.

2.1.4 Heater Controls

Controls for the heaters shall be in an isolated compartment with a hinged cover which provides full access for servicing. All heater and control wiring shall terminate in the control compartment. Complete wiring diagram shall be attached to the inside of the access cover. Controls for the

heaters shall include all of the following:

2.1.4.1 3-Pole Contractor

Heavy duty, 3-pole contractor, which provides quiet, efficient operation.

2.1.4.2 Fan Delay Relay

Bi-metallic, snap action fan delay relay, which energizes the fan after the heating element reaches operating temperature. Relay shall de-energize the fan when the temperature returns to normal.

2.1.4.3 Thermal Cut-Out

Thermal cut-out to de-energize the heating element if it overheats and resets when the temperature returns to normal.

2.1.4.4 Control Transformer

Fused control transformer with 24 volt secondary.

2.1.5 Heating Element

Heating element shall be finned tubular steel and non-glowing.

2.1.6 Fan Motor

Fan motor shall be totally enclosed with thermal protector and sealed bearings.

2.1.7 Dampers

Dampers shall be parallel blade type, tight seal design. Frame shall be welded 12 gauge galvanized steel and blades shall be extruded aluminum in airfoil shape. The connection of the damper frame to the louver frame shall include a non-conductive gasket or spacer. Dampers mounted on the generator set ductwork shall be mounted to direct the discharge away from the engine and operated in parallel when waste heat inside the pump station is desired. All dampers shall be normally closed with opening movement provided by damper motors.

2.1.7.1 Damper Motors

Damper motors shall be designed for operation of dampers from 120 V.A.C. with a timing cycle of 30 to 60 seconds and stroke as required for damper linkage furnished or direct shaft mounting. All damper motors for engine generator cooling operation shall be suitable for operation on commercial power, stand-by generator power, or low voltage power with an internal transformer. Manual operation override shall be available with a hex handcrank. Operation of the damper motors must be maintained during power outages to assure adequate supply of cooling air through the engine. The bypass damper motors shall be provided with a proportional control

operation that directs waste heat into the pump station space, when operated in conjunction with exhaust air damper modulation. Damper actuators shall be similar or equal to Belimo AF series spring return air damper actuators, as manufactured by Belimo Air Controls, Danbury, CT, 06810.

2.1.8 Modulating Thermostat

A modulating thermostat shall be provided for the engine cooling air to monitor room air temperature inside the pump station. When the temperature in the room falls below the set point (40 degrees F. to 99 degrees F. adjustable) and the generator is running, the bypass dampers (CD-4) shall open 100% and the interlocked exhaust damper (CD-1) shall close to a minimum position. The minimum position shall be set during the building balancing operation so that at rated engine speed the pressure in the engine exhaust duct work does not exceed Onan's maximum pressure of 0.5 inches of water. As the room temperature rises to the thermostat set point, the exhaust damper shall open to 100% and the bypass dampers shall close to 0% open. Thermostat shall be T8401 "Tradeline" series as manufactured by Honeywell Inc., Minneapolis, Minnesota or equal.

2.1.9 Ductwork

All ductwork shall be galvanized steel sheets. Sheet metal ductwork shall comply with SMACNA Duct Standards. All ductwork shall be substantially airtight with no audible leaks, no dust marks showing at the duct joints, connections to equipment and grilles.

2.1.9.1 General

All duct work and sheetmetal housings shall be fabricated of prime, lock forming quality galvanized steel sheets. Gauges of metal and methods of construction and assembly shall be in a neat, workmanlike manner with all ducts run straight, level, and plumb on adequate hangers and supports to prevent sagging.

2.1.9.2 Duct Insulation Materials (Restrooms)

Exhaust Air Ducts, Concealed in Attic

- (1) Manville "Microlite" FSK fiberglass blanket or CertainTeed standard duct wrap, with vapor barrier finish jacket, adhered to duct exterior with insulation bonding adhesive with joints lapped and sealed with pressure sensitive tape for complete vapor barrier.
- (2) Ductwork including round, shall be additional secured at bottom with mechanical fasteners, 16 inches o.c.
- (3) Thermal conductivity: 1-1/2# density = R-4.16/K-0.24 per inch, at 75° F. mean temperature.

2.1.9.3 Engine Exhaust Pipe Insulation (Pump Station)

All components of the diesel engine exhaust system shall be insulated with

calcium silicate material meeting ASTM C 533, Type I for indoor use. That portion of the pipe exterior to the roof thimble shall be uninsulated. Pipe insulation shall be rated for temperatures between 650 degrees C not less than 150 mm thick or not less than 6 inches thick for 1200 degree F. rating. Insulation rating and thickness shall be in accordance with the engine manufacturer recommendation. Insulation shall be shaped to fit the pipe and fittings. The engine muffler and flexible exhaust section shall not be insulated. A metallic jacket or two layers of high temperature adhesive with a layer of glass cloth between shall provide a smooth continuous surface resistant to mechanical damage.

2.1.10 Grilles (Restrooms)

Units shall be single deflection, galvanized steel construction.

2.1.10.1 Grilles and Diffusers

Grilles and diffusers shall be constructed with welded hairline joints and a high quality finish as scheduled. Screws and fasteners (except for mounting grille to walls) on the face of grilles are not acceptable.

2.1.10.2 Grille Data

Grille manufacturer shall make sufficient data on grille performance available to balancing contractor to permit him to properly make air volume adjustments with standard meters and tools.

2.1.10.3 Grilles

Grilles shall fit securely against surrounding surface and shall be fitted with sponge rubber gaskets to prevent streaking. All grilles in showers, toilets, kitchens and other high moisture areas shall be all aluminum construction.

2.1.10.4 Grille Manufacturer

4) Grilles shall be as manufactured by Krueger, Metal-Aire, Tuttle & Bailey, Price, Kee's, Nailor, Air Guide, Titus or Anemostat.

2.1.11 Steel Sheets

Steel sheets shall conform to ASTM A 525.

2.1.12 Louvers

Louvers shall be furnished for installation in walls as shown. Louvers shall be connected to dampers. Louvers shall be aluminum construction. Louvers shall be all extruded construction, .081 thickness minimum. Blades shall be extruded aluminum, parallel or opposed as required. Blade edges shall be designed to carry water off to integral jamb downspouts. Design of the louver shall prevent rainwater from entering the airstream. Louvers shall be furnished with a birdscreen. Louvers shall receive electrolytically deposited color anodized finish complying with Aluminum

Association AA-C22A44. Finish is applied to 0.7 mils (.018) minimum thickness onto chemically etched and pretreated aluminum extrusions. Color shall be selected by the Contracting Officer from manufacturer's standard colors.

2.1.13 Air Quality Monitoring System

The Contractor shall furnish one Air Quality Monitoring System for use at any of the wet wells of the pump stations. The Air Quality Monitoring System shall be a portable combustible gas and oxygen detector, nickel-cadmium rechargeable battery powered, and packaged for outdoor use. The unit shall indicate oxygen partial pressure from 15.00% to 25.00 % with plus or minus 0.25% resolution on the readout meter. An oxygen content alarm shall be factory preset to sound at the OSHA oxygen limits (19.58% low O2 and 22.0% high O2) and shall have adjustable alarm thresholds in at least 0.5% increments. The monitor system shall also test for OSHA compliance of at least the following gases: CO (carbon monoxide), NO2 (nitrogen dioxide), H2S (hydrogen sulfide), and CH4 (methane). The Monitor System shall be capable of continuous monitoring for each gas, factory preset to alarm when the OSHA 1926.55 threshold is exceeded. Gage shall be scaled to read "percent lower explosion limit" (0% to 100%) scale. The system shall also be capable of separately detecting hydrogen sulfide gas in volumetric terms "parts per million" (PPM) within the minimum detection range 1 PPM to 40 PPM with adjustable alarm within the range. The alarm signal shall be loud audible (90+ dB at 50 foot "A" fast response, per SAE J919), as well as visual indicator lamp on the meter(s). Also included with the system shall be all the equipment required for meter calibration including pressure vessels with the required calibration gas, any special tools and parts, and complete instructions.

2.1.14 Air Ventilation Blowers

The Contractor shall furnish two portable air ventilation blowers for use primarily at pump station wetwell. Each blower shall be 480 volt AC powered adjustable air flow to at least 5300 CFM and shall come with a flexible waterproof outlet duct of at least 16 inch diameter in size and in two 10 foot long connectable section with splicing sleeve and connecting clamps. Each blower shall be mounted on a wheeled dolly and weigh not more than 90 pounds. Each blower motor, power cord, and electrical plug connector shall meet the requirements of SECTION 16415: ELECTRICAL WORK, INTERIOR. Each blower shall be equipped with a 50 foot extension cord detachable at blower with same disconnect at plug outlet. Each blower shall be weather proof to run unaffected in rain with NEMA 4 junctions and 3 phase TEFC motor. Each blower and base should be similar to "Coppus TA-16" as manufactured by Coppus Engineering Corp., Worcester, Massachusetts, 01615-3999.

PART 3 EXECUTION

3.1 INSTALLATION

Unless otherwise indicated or specified, all materials and equipment shall be installed in accordance with the manufacturer's recommendations.

3.1.1 Ductwork

All ductwork shall be installed in accordance with SMACNA Duct Standards. Ducts shall be secured and anchored to the building structures and shall be fabricated and installed in such a manner to prevent vibration under operating conditions.

3.1.2 Unit Heaters

Unit heaters shall be wall mounted as shown on the drawings. Thermostats shall be installed in accordance with the manufacturer's recommendation and located as shown on the drawings.

3.1.3 Electrical Work

Electrical work shall comply with NFPA 70 (NEC). Electric heaters specified herein shall be provided complete with motor and controls. Exhaust fans shall be provided with separate motor starters and disconnects mounted on the fan.

3.2 TESTING

Heating and ventilating systems specified under this section shall be tested and inspected at the time of the pumping tests. If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. The ventilation fan for restrooms shall be tested and inspected at the time of inspection of those structures.

3.2.1 Fans

The speed and direction of rotation of all fans shall be checked and verified. Motor current shall be measured. All ventilation system shall be operated for a period of not less than 15 minutes.

3.2.2 Heaters

All the heaters shall be operated for a period of not less than 15 minutes. Current draw shall be measured.

3.2.3 Louvers and Motorized Damper Function

3.2.3 Louver and motorized damper function - As part of the testing specified in Section 16264: DIESEL GENERATOR INSTALLATION, louvers and dampers shall be tested for air flow profile, quantity with inlet and discharge air temperatures. Ambient outside temperature and interior temperature within the pump station at four locations shall be measured.

3.2.4 Ductwork

3.2.3 Ductwork shall be leak tested in accordance with SMACNA Duct Standards. Contractor shall conduct balancing test on all exhaust systems. Flow rates shall be within 10% of that shown on the drawings.

3.3 Attachments

- (1) HVAC Schedule
- (2) Control Schematics
 - -- End of Section --

HVAC	EQUIPMENT SCHEDULE								
MARK	LOCATION/FUNCTION	AIR TSP FLOW (IN TYPE		MOTOR DATA			ACCESSORIES	BASED ON GREENHECK	
		(CFM)	W.C.)	DRIVE	HP	RPM	VOLT/PH/HZ		GIVELINITECK
EF-1	OP. FLOOR EXHAUST	2126	0.25	DIRECT	1/4	860	208/3/60	1	CW-160C
EF-2	SUMP FLOOR EXHAUST	3035	0.25	DIRECT	3/4	1140	208/3/60	1	CW-160B
ACCES	SORIES: 1. BACKDRAFT DA	MPER							

CONTROL DAMPER SCHEDULE								
MARK	DESCRIPTION	NUMBER	TYPE CFI		STATIC PRESSURE	SIZE	BASED ON	INTERLOCK W/
		REQ'D			(IN. W.G.)	(W X H IN)	RUSKIN	
CD-1	ENGINE GEN. EXHAUST	1	OPPOSED BLADE	19700	< 0.01	48 X 78	OD 102	ENGINE GEN INTAKE
CD-2	ENGINE GEN. INTAKE	1	OPPOSED BLADE	22330	< 0.01	48 X 78	CD 102	ENGINE GEN, EXHAUST
CD-3	OP. FLOOR INTAKE	2	OPPOSED BLADE	1065	< 0.01	48 X 24		OPER.ROOM EXHAUST
CD-4	BYPASS DAMPER	2	OPPOSED BLADE	7500	< 0.01	16 X 28	CD 102	ROOM TEMP CD-1 & CD-2

UNIT HE	ATER SCHEDULE										
MARK	LOCATION	TYPE	MTG HT	ELEMENT RATING	HEATING COIL DATA		FAN	мото	R DATA	BASED ON	REMARKS
NUMBER			(FT)	(KW)	VOLTS.PH/HZ	CFM	HP	RPM	VOLY/PH/HZ	CHROMALOX	
EUH-1&2	CONTROL ROOM	HORIZ.	10	7.5	480/3/60	750	1/10	1550	480/3/60	LUH-10-23-32	2 REQ'D
ACCESSO	RIES: 1. WALL MO	UNTING	BRA	CKET							

2. THERMOSTAT 3. SUMMER FAN SWITCH KIT

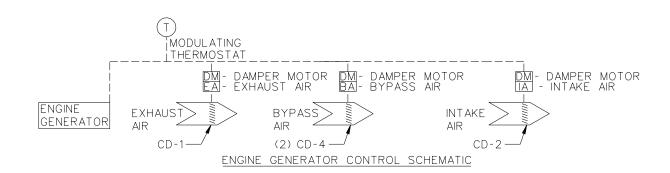


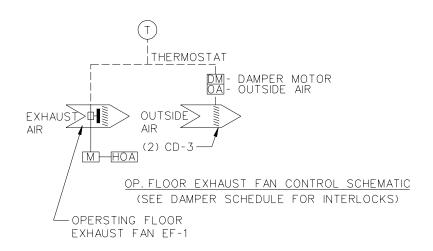
EAST GRAND FORKS, MINNESOTA FLOOD CONTROL

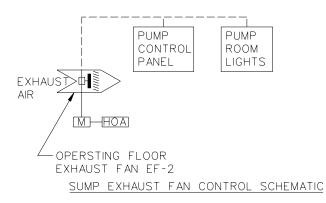
HVAC SCHEDULE

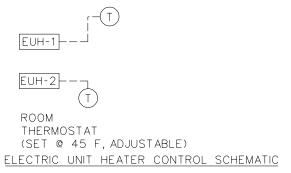
FILE NO. DATE 04/01/02

DRAWING NAME J. NADAMNHVACSCHEDULE. DGN LAYERS OFF!











EAST GRAND FORKS, MINNESOTA FLOOD CONTROL

CONTROL SCHEMATICS

FILE NO.

DATE

04/01/02

DRAWING NAME JINADAMNSCHEMATIC.DON

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DIVISION 16 - ELECTRICAL

SECTION 16120

INSULATED WIRE AND CABLE

06/02

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PART 3 EXECUTION (Not Applicable)

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SECTION 16120

INSULATED WIRE AND CABLE 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASSOCIATION OF EDISON ILLUMINATING COMPANIES (AEIC)

AEIC CS5 (Oct 1987; 9th Ed) Thermoplastic and Crosslinked Polyethylene Insulated

Shielded Power Cables Rated 5 Through 35 kV

AEIC CS6 (Oct 1987; 5th Ed; Rev Mar 1989) Ethylene

Propylene Insulated Shielded Power Cables

Rated 5 Through 69 kV

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE Std 383 (1974; R 1992) Class 1E Electric Cables,

Field Splices, and Connections for Nuclear

Power Generating Stations

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA WC 7 (1988) Cross-Linked-Thermosetting-

Polyethylene-Insulated Wire and Cable for

the Transmission and Distribution of

Electrical Energy

NEMA WC 8 (1988) Ethylene-Propylene-Rubber-

Insulated Wire and Cable for the Transmission and Distribution of

Electrical Energy

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals with a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Installation Instructions; FIO.

The Contractor shall submit cable manufacturing data. Submittals are not required for utility supplied cable that is installed by the utility on its system.

SD-09 Reports

Tests, Inspections, and Verifications; FIO.

4 certified copies of test reports shall be submitted by the contractor.

1.3 DELIVERY, STORAGE, AND HANDLING

Furnish cables on reels or coils. Each cable and the outside of each reel or coil, shall be plainly marked or tagged to indicate the cable length, voltage rating, conductor size, and manufacturer's lot number and reel number. Each coil or reel of cable shall contain only one continuous cable without splices. Cables for exclusively dc applications, as specified in paragraph HIGH VOLTAGE TEST SOURCE, shall be identified as such. Shielded cables rated 2,001 volts and above and shall be reeled and marked in accordance with Section I of AEIC CS5 or AEIC CS6, as applicable. Reels shall remain the property of the Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Rated Circuit Voltages

All wire and cable shall have minimum rated circuit voltages in accordance with Table 3-1 of NEMA WC 7 or NEMA WC 8.

2.1.2 Conductors

2.1.2.1 Material

Conductors shall conform to all the applicable requirements of Section 2 of NEMA WC 7 or Part 2 of NEMA WC 8 as applicable and shall be annealed copper. Copper conductors may be bare, or tin- or lead-alloy-coated, if required by the type of insulation used. Conductors supplied by and installed by the utility on its system shall conform to the utility's requirements.

2.1.2.2 Size

Minimum wire size shall be No. 12 AWG for power and lighting circuits; No. 10 AWG for current transformer secondary circuits; No. 14 AWG for potential transformer, relaying, and control circuits; No. 16 AWG for annunciator circuits; and No. 19 AWG for alarm circuits. Minimum wire sizes for rated circuit voltages of 2,001 volts and above shall not be less than those listed for the applicable voltage in Table 3-1 of Section 3 of NEMA WC 7 or Part 3 of NEMA WC 8, as applicable.

2.1.2.3 Stranding

Conductor stranding classes cited herein shall be as defined in Appendix L of NEMA WC 7 or NEMA WC 8, as applicable. Lighting conductors No. 10 AWG and smaller shall be solid or have Class B stranding. Any conductors used between stationary and moving devices, such as hinged doors or panels, shall have Class H or K stranding. All other conductors shall have Class B or C stranding, except that conductors shown on the drawings, or in the schedule, as No. 12 AWG may be 19 strands of No. 25 AWG, and conductors shown as No. 10 AWG may be 19 strands of No. 22 AWG.

2.1.2.4 Conductor Shielding

Conductor shielding conforming to paragraph 2.7 of NEMA WC 7 or NEMA WC 8, as applicable, shall be used on power cables having a rated circuit voltage above 2,000 volts. In addition, conductor shielding for shielded cables shall also comply with Section C of AEIC CS5 or AEIC CS6. Strict precautions shall be taken after application of the conductor shielding to prevent the inclusion of voids or contamination between the conductor shielding and the subsequently applied insulation.

2.1.2.5 Separator Tape

Where conductor shielding, strand filling, or other special conductor treatment is not required, a separator tape between conductor and insulation is permitted.

2.1.3 Insulation

2.1.3.1 Insulation Material

Insulation shall be cross-linked thermosetting polyethylene (XLPE) type, meeting the requirements of Section 3 or paragraph 7.7 of NEMA WC 7 as applicable, or an ethylene-propylene rubber (EPR) type meeting the requirements of Part 3 of NEMA WC 8.

2.1.3.2 Insulation Thickness

The insulation thickness for each conductor shall be based on its rated circuit voltage.

- a. Power Cables/Single-Conductor Control Cables, 2,000 Volts and Below The insulation thickness for single-conductor cables rated 2,000 volts and below shall be as required by Table 3-1, Section 3 of NEMA WC 7 or Table 3-1, Part 3, of NEMA WC 8, as applicable. Column "A" thickness of Table 3-1 of NEMA WC 7will be permitted only for single-conductor cross-linked thermosetting polyethylene insulated cables without a jacket. NEMA WC 8 ethylene-propylene rubber-insulated conductors shall have a jacket. Column "B" thickness shall apply to single-conductor cables that require a jacket and to individual conductors of multiple-conductor cables with an overall jacket.
- b. Multiple-Conductor Control Cables The insulation thickness of multiple-conductor cables used for control and related purposes shall be as required by Table 7-32 of NEMA WC 7 or Table 7.5.1 of NEMA WC 8

as applicable.

2.1.4 Jackets

All cables shall have jackets meeting the requirements of Section 4 of NEMA WC 7, or Part 4 of NEMA WC 8, as applicable, and as specified herein. Individual conductors of multiple-conductor cables shall be required to have jackets only if they are necessary for the conductor to meet other specifications herein. Jackets of single-conductor cables and of individual conductors of multiple-conductor cables, except for shielded cables, shall be in direct contact and adhere or be vulcanized to the conductor insulation. Multiple-conductor cables and shielded single-conductor cables shall be provided with a common overall jacket, which shall be tightly and concentrically formed around the core. Repaired jacket defects found and corrected during manufacturing are permitted if the cable, including jacket, afterward fully meets these specifications and the requirements of the applicable standards.

2.1.4.1 Jacket Material

The jacket shall be one of the materials listed below. Polyvinyl chloride compounds will not be permitted.

a. General Use

- (1) Heavy-duty black neoprene (NEMA WC 8, paragraph 4.4.3).
- (2) Heavy-duty chlorosulfonated polyethylene (NEMA WC 8, paragraph 4.4.10).
- (3) Heavy-duty cross-linked (thermoset) chlorinated polyethylene (NEMA WC 8, paragraph 4.4.11).
- b. Accessible Use Only, 2,000 Volts or Less Cables installed where they are entirely accessible, such as cable trays and raceways with removable covers, or where they pass through less than 10 feet of exposed conduit only, shall have jackets of one of the materials specified in above paragraph GENERAL USE, or the jackets may be of one of the following:
 - (1) General-purpose neoprene (NEMA WC 8, paragraph 4.4.4).
 - (2) Black polyethylene (NEMA WC 8, paragraph 4.4.6).
 - (3) Thermoplastic chlorinated polyethylene (NEMA WC 8, paragraph 4.4.7).

2.1.4.2 Jacket Thickness

The minimum thickness of the jackets at any point shall be not less than 80 percent of the respective nominal thicknesses specified below.

a. Multiple-Conductor Cables - Thickness of the jackets of the individual conductors of multiple-conductor cables shall be as required

by Section 4, Table 4-6 of NEMA WC 7 or Part 4, Table 4-4 of NEMA WC 8, and shall be in addition to the conductor insulation thickness required by Column B of Table 3-1 of the applicable NEMA publication for the insulation used. Thickness of the outer jackets or sheaths of the assembled multiple-conductor cables shall be as required by Section 4, Table 4-7, of NEMA WC 7 or Part 4, Table 4-5, of NEMA WC 8.

b. Single-Conductor Cables - Single-conductor cables, if nonshielded, shall have a jacket thickness as specified in Section 4, Table 4-4 of NEMA WC 7 or Part 4, Table 4-2 of NEMA WC 8. If shielded, the jacket thickness shall be in accordance with the requirements of Section 4, Table 4-5 of NEMA WC 7 or Part 4, Table 4-3 of NEMA WC 8.

2.1.5 Identification

2.1.5.1 Color-coding

Insulation of individual conductors of multiple-conductor cables shall be color-coded in accordance with paragraph 5.3 of NEMA WC 8, except that colored braids will not be permitted. Only one color-code method shall be used for each cable construction type. Control cable color-coding shall be in accordance with Table 5-2 of NEMA WC 8. Power cable color-coding shall be black for Phase A, red for Phase B, blue for Phase C, white for grounded neutral, and green for an insulated grounding conductor, if included.

2.1.6 Cabling

Individual conductors of multiple-conductor cables shall be assembled with flame-and moisture-resistant fillers, binders, and a lay conforming to Part 5 of NEMA WC 8, except that flat twin cables will not be permitted. Fillers shall be used in the interstices of multiple-conductor round cables with a common covering where necessary to give the completed cable a substantially circular cross section. Fillers shall be non-hygroscopic material, compatible with the cable insulation, jacket, and other components of the cable. The rubber-filled or other approved type of binding tape shall consist of a material that is compatible with the other components of the cable and shall be lapped at least 10 percent of its width.

2.1.7 Dimensional Tolerance

The outside diameters of single-conductor cables and of multiple-conductor cables shall not vary more than 5 percent and 10 percent, respectively, from the manufacturer's published catalog data.

2.2 INSTALLATION INSTRUCTIONS

The following information shall be provided by the cable manufacturer for each size, conductor quantity, and type of cable furnished:

a. Minimum bending radius, in inches - For multiple-conductor cables, this information shall be provided for both the individual conductors and the multiple-conductor cable.

- b. Pulling tension and sidewall pressure limits, in pounds.
- c. Instructions for stripping semiconducting insulation shields, if furnished, with minimum effort without damaging the insulation.
- d. Upon request, compatibility of cable materials and construction with specific materials and hardware manufactured by others shall be stated. Also, if requested, recommendations shall be provided for various cable operations, including installing, splicing, terminating, etc.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

2.3.1 Cable Data

Manufacture of the wire and cable shall not be started until all materials to be used in the fabrication of the finished wire or cable have been approved by the Contracting Officer. Cable data shall be submitted for approval including dimensioned sketches showing cable construction, and sufficient additional data to show that these specifications will be satisfied.

2.3.2 Inspection and Tests

Inspection and tests of wire and cable furnished under these specifications shall be made by and at the plant of the manufacturer, and shall be witnessed by the Contracting Officer or his authorized representative, unless waived in writing. The Government may perform further tests before or after installation. Testing in general shall comply with Section 6 of NEMA WC 7 or Part 6 of NEMA WC 8. Specific tests required for particular materials, components, and completed cables shall be as specified in the sections of the above standards applicable to those materials, components, and cable types. Tests shall also be performed in accordance with the additional requirements specified below. The utility company may utilize cable from its stock, for use on its system, without any additional inspections or tests.

2.3.2.1 High-Voltage Test Source

Where the applicable standards allow a choice, high-voltage tests for cables to be used exclusively on dc circuits shall be made with dc test voltages. Cables to be used exclusively on ac circuits shall be tested with ac test voltages. If both ac and dc will be present, on either the same or separate conductors of the cable, ac test voltages shall be used.

2.3.2.2 Flame Tests

All multiple-conductor and single-conductor cable assemblies shall pass IEEE Std 383 flame tests, paragraph 2.5, using the ribbon gas burner. Single-conductor cables and individual conductors of multiple-conductor cables shall pass the flame test of NEMA WC 7, paragraph 7.7.3.1.3. If such tests, however, have previously been made on identical cables, these tests need not be repeated. Instead, certified reports of the original qualifying tests shall be submitted. In this case the reports furnished

under paragraph REPORTS, shall verify that all of each cable's materials, construction, and dimensions are the same as those in the qualifying tests.

2.3.2.3 Independent Tests

The Government may at any time make visual inspections, continuity or resistance checks, insulation resistance readings, power factor tests, or dc high-potential tests at field test values. A cable's failure to pass these tests and inspections, or failure to produce readings consistent with acceptable values for the application, will be grounds for rejection of the cable.

2.3.2.4 Reports

Results of tests made shall be furnished. No wire or cable shall be shipped until authorized. Lot number and reel or coil number of wire and cable tested shall be indicated on the test reports.

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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SECTION 16140

ELECTRICAL SERVICE

06/02

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SECTION 16140

ELECTRICAL SERVICE 06/02

PART 1 GENERAL

1.1 GENERAL

- (1) Applicable provisions of Division 1 shall govern work in this section.
- (2) The Contractor shall make all necessary arrangements for installation of a 100 amp (120/240 volt), single phase) temporary service at the job site. Provide 120 volt outlets and lighting where required for all trades to execute their work. All temporary power shall be in accordance with OSHA standards.
- (3) Provide a complete electrical service as specified.

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330: SUBMITTAL PROCEDURES:

SD-01 Data

Metering Data; FIO

Product data: For utility company electricity-metering components.

SD-04 Drawings

Meter Component Drawings; GA

Shop drawings: Dimensioned plans and sections or elevation layouts and single-line diagram of electricity-metering component assemblies specific to this Project.

1.3 QUALITY ASSURANCE

1.3.1 Electrical Components

Electrical components, devices and accessories: Listed and labelled as defined in NEC (NFPA 70), Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.3.2 Metering Devices

Devices for utility company electricity metering: Comply with utility company published standards.

1.3.3 Codes

Comply with NEC (NFPA 70).

1.4 COORDINATION

1.4.1 Coordination

Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.

1.4.2 Sequencing and Integration

Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the work. Coordinate installing large equipment that requires positioning before closing in the building.

1.4.3 Utility Companies

Coordinate electrical service connections to components furnished by utility companies.

1.4.4 Exterior Utilities and Services

Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for service entrances and electricity-metering components.

1.4.5 Electrical Identification Devices

Where electrical identification devices are applied to field-furnished surfaces, coordinate installation of identification devices with completion of finished surface.

PART 2 PRODUCTS

2.1 GENERAL

Materials shall conform to products as specified in other sections of these specifications.

2.2 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

Comply with requirements of electrical power utility company for current transformer cabinets and meter sockets.

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Metering Equipment

All metering equipment shall meet requirements of the power company.

3.1.2 Temporary Service

Installation of the temporary service shall be coordinated with the utility company as well as the Contracting Officer. The cost for the services will be established by the City of East Grand Forks Water and Light Department and paid by the Contractor. The point of contact to coordinate the service with is:

Mr. Dan Boyce General Manager City of East Grand Forks Water and Light Department City Hall 600 DeMers Ave. NW East Grand Forks, MN 56721 218.773.1163

It shall be the Contractor's responsibility to verify and coordinate provisions for temporary power with the Government and other Contractors. Avoid obstructing corridors and other areas as much as practical. All temporary wiring shall be installed in a manner so as not to create any hazardous situations in the facility.

3.1.2.1 Temporary System

The temporary system shall consist of temporary lighting sufficient to enable all trades to complete their work and to enable the Contracting Officer's Representative to check all work as it is being done in each and every room of the building. Illumination shall in all areas meet or exceed State Code Requirements (see Ind. 35.28). Provide at least one outlet for each 400 square feet of floor space, 120 volt single phase. Circuits shall be 20 amp single pole. Lighting lamps shall be at least 200 watt.

3.1.2.2 Temporary Electrical Circuits

In accordance with the latest issue of the National Electrical Code, all temporary electrical circuits for construction purposes shall be equipped with combination ground fault interrupter and circuit breakers meeting the requirements of UL for Class A, Group 1 devices.

3.1.3 Electrical Services

Furnish and install new electrical services as indicated on the plans. The Contractor shall make all necessary arrangements with the utility company for complete installation of the new electrical service and power entrance.

3.1.4 Utility Transformer

New electrical services shall run underground from the new utility transformer provided by East Grand Forks Water and Light Department.

3.1.5 Payment to Utility Companies

The Contractor shall be responsible for paying all utility company service charges as part of the Contract. Contact East Grand Forks Water and Light Department (W & L Department) to obtain information on the cost of the service.

3.1.6 Power Outages

Notify Owner prior to any pre-planned power outages.

3.2 ELECTRICITY-METERING EQUIPMENT

3.2.1 Box for Metering Equipment

Provide and install box for utility metering equipment when required per utility requirements and recommendations.

3.2.2 Conduit and Wire

Provide and install conduit and wire required for service entrance per utility requirements and recommendations.

3.2.3 Utility Company Metering Equipment

Install utility company metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.3 SERVICE TRANSFORMER

3.3.1 Padmounted Transformer

The W & L Department will supply 480Y/277 volts via a 3 phase padmounted transformer. The W & L Department will provide transformer pad and ground sleeve and ground grid. The W&L Department will connect all primary cables and grounding conductors to transformer.

3.3.2 Transformer Location

The Contractor shall provide secure suitable location for transformer. Location must comply with the W&L Department criteria in order to comply with NESC.

3.4 SECONDARY VOLTAGE SERVICE

3.4.1 Padmounted Transformers

Padmounted transformers will be provided with secondary spade terminals with appropriate number of NEMA holes

3.4.2 Secondary Conductor

The Contractor shall furnish and install secondary conductor from their service panel or CT cabinet to transformer along with NEMA 2-hole connectors on each secondary conductor at the transformer.

3.4.3 Connection of Secondary Conductor

The W&L Department will connect the secondary conductor connectors to the transformer spade terminals.

3.4.4 Transformer to Service Panel

Conduit from transformer to service panel or CT cabinet shall be installed by the Contractor.

3.5 SERVICE METERING

3.5.1 CT Cabinet

The Contractor shall provide a CT cabinet. The CT cabinet shall be properly sized to accommodate the W&L Department furnished bar type CT's. The Contractor shall furnish and install all connectors and secondary conductor terminations within the CT cabinet.

3.5.2 Bar Type CT's

The East Grand Forks Water and Light Department will furnish bar type CT's to be installed in the CT cabinet. The CT's shall be installed by the Contractor. The Water and Light Department will provide dimensional drawings for the typical CT's utilized for this type of service.

3.5.3 Conduit

The Contractor shall furnish and install a 1" conduit for the CT secondary wire between the CT cabinet and the meter location.

3.5.4 Meter Socket

The Contractor shall install the W&L Department furnished meter socket at a suitable location which is readily accessible to W&L Department personnel at all times.

3.5.5 KWH/KW Meter

The W&L Department will furnish and install a KWH/KW meter.

3.5.6 Current and Potential Wiring

The W&L Department will furnish and install the current and potential wiring in the 1" conduit noted and will make connections to the meter socket and CT's.

-- End of Section --

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SECTION 16202

OVERHEAD ELECTRICAL TRANSMISSION SYSTEM REMOVAL

06/02

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SECTION 16202

OVERHEAD ELECTRICAL TRANSMISSION SYSTEM REMOVAL 06/02

PART 1 GENERAL

1.1 WORK INCLUDED

- A. These specifications provide for the removal or retirement of overhead transmission line and distribution underbuild facilities.
- B. All work shall be done in a thorough and workmanlike manner in accordance with the Plans and Specifications.
- C. The transmission line removal includes all existing 69kV transmission line and 5kV distribution underbuild facilities with the work starting at the Water Plant Substation west to the switch structure and to the two pole inline double deadend Xcel Energy structure #325 at the Red River.
- D. All 5kV distribution taps off the 5kV distribution underbuild will be removed by the Water & Light Department of the City of East Grand Forks, Minnesota.

1.2 REFERENCE STANDARDS

A. All work shall comply with the latest edition of the National Electric Safety Code, except where local regulations are more stringent, in which case local regulations shall govern.

1.3 STORAGE AND HANDLING

- A. All materials removed from the transmission line and distribution underbuild shall be permanently stored in a safe, and secure location with due regard to public safety.
- B. A permanent storage site has been designated by the Water & Light Department of the City of East Grand Forks, Minnesota indicated as "Utility Storage Site 1A" as shown on the plans.
- C. Poles shall be stored at the Utility Storage Site 1A on wood bunkers spaced six feet apart that will not allow stored poles to lie on the ground. Wood bunkers may consist of short stub poles.
- D. Some material and equipment has been designated for crating. Crates shall be provided by the Contractor and shall be of substantial wooden construction to provide strength and mechanical protection and secured to load and unload by forklift and transport by truck.

1.4 OWNERSHIP OF REMOVED MATERIAL

A. Material, hardware, and poles shall remain the property of the Water & Light Department of the City of East Grand Forks, Minnesota and shall be moved to the Utility Storage Site 1A from the project site.

PART 2 PRODUCTS

This section not used.

PART 3 EXECUTION

3.1 WOOD POLES

- A. Wood poles shall be completely removed in one piece and by means that shall minimize disturbance to the surrounding area. Poles shall not be cut off to facilitate removal. Adequate precautions shall be taken and coordinated with the appropriate City and State authority to secure the immediate work area.
- B. Once a pole has been removed, it shall be taken to "Utility Storage Site 1A". Poles that have been removed cannot be left along the right-of-way over night or on weekends.
- C. Pole holes shall be filled and tamped immediately after the pole has been removed. The Contractor shall furnish and install backfill material to fill the hole.
- D. Once the pole has been removed and the hole backfilled, the area shall be restored to its original condition.

3.2 CONDUCTOR

- A. The conductor comprising the transmission line and distribution underbuild facilities shall be removed in an orderly manner. All necessary precautions shall be taken to provide for safety to the public and protection of existing buildings or facilities.
- B. The Contractor shall furnish wire reels on which to place existing conductor. Conductor wound onto reels shall be segregated by size and type. Different conductors shall not be wound onto the same reel. After placement on reels, conductor shall be stored at Utility Storage Site 1A.
- C. Conductor removal shall be coordinated with Xcel Energy Company along with the appropriate City and State authority.
- D. This project is located in close proximity to existing transmission and distribution lines. The Contractor shall arrange the outages on facilities or provide necessary protection when conducting this work.

3.3 STRUCTURE FRAMING ASSEMBLIES

A. 69kV transmission structure framing assemblies shall be removed from

the poles. Insulators, crossarms and braces, and hardware shall be segregated, inventoried, and moved to the Utility Storage Site 1A. Insulators, both post and suspension type shall be crated. Suspension insulators may be crated in assembly strings.

B. 5kV distribution underbuild structure framing assemblies shall be removed from the poles. Insulators, crossarms and braces, and hardware shall be segregated, inventoried, and moved to the Utility Storage Site 1A.

3.4 ANCHORS AND GUYS

- A. The work includes removal of guys and anchors. Anchor rods shall be removed from all PISA anchors. All square shaft anchors shall be completely removed. Any other anchor rods shall be cut off approximately 18" below the ground line. Guys and anchors are considered as an integral part of the structure being guyed and shall be removed with the structure.
- B. All guys shall be removed completely including guy guards.

3.5 GROUNDING

- A. Some poles include driven ground rods. Those grounds shall be removed at the time the pole is removed.
- B. Pole grounds stapled to the pole need not be removed from the pole.

3.6 69 Kv 3-WAY SWITCH - 3W-SW

- A. Remove, disassemble, inventory and crate the switching platform assemblies by phase along with the control rods and operating mechanism.
- B. Each switching platform assembly shall be crated. Three switch crates shall be required. Switch components shall be included in the switch crate. Each switch assembly shall be moved to Utility Storage Site 1A. Crates shall be appropriately labeled.
- C. Control rods and operating mechanisms shall be crated. Control rods and operating mechanisms shall be moved to Utility Storage Site 1A. Crates shall be appropriately labeled.
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SECTION 16203

ELECTRICAL SUBSTATION REMOVAL

06/02

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SECTION 16203

ELECTRICAL SUBSTATION REMOVAL 06/02

PART 1 GENERAL

1.1 WORK INCLUDED

- A. These specifications provide for the removal of electrical substation facility.
- B. All construction work shall be done in a thorough and workmanlike manner in accordance with the staking sheets, Plans and Specifications, and the Construction Drawings.
- C. The electrical substation removal includes of all above ground structures within the facility known as the Water Plant Substation.

1.2 REFERENCE STANDARDS

A. All work shall comply with the latest edition of the National Electric Safety Code, except where local regulations are more stringent, in which case local regulations shall govern.

1.3 STORAGE AND HANDLING

- A. All materials removed from the electric substation facility shall be permanently stored in a safe, and secure location with due regard to public safety.
- B. Two permanent storage sites have been designated by the Water & Light Department of the City of East Grand Forks, Minnesota indicated as "Utility Storage Site 1A" and "Utility Storage Site 1B"as shown on the plans.
- C. Some material and hardware has been designated to be crated. Crates shall be provided by the Contractor and shall be of substantial wooden construction to provide strength and mechanical protection and secured to load and unload by forklift and transport by truck.

1.4 OWNERSHIP OF REMOVED MATERIAL

- A. Material, hardware, switches, reclosers, voltage regulators, fencing fabric and gates, high and low side steel, poles, etc. shall remain the property of the Water & Light Department of the City of East Grand Forks, Minnesota and shall be moved to the Utility Storage Site 1A or 1B from the project site.
- B. Substation concrete pads and foundations, control building, ground grid and fence posts will be abandon in place by the Water & Light Department of the City of East Grand Forks, Minnesota and shall be removed and properly

disposed of by the Contractor as required to clear way for levee construction.

PART 2 PRODUCTS

This section not used.

PART 3 EXECUTION

3.1 STRUCTURAL STEEL

A. High voltage, low voltage bus support, low voltage, and riser structure steel shall be disassembled sorted, inventoried, and moved to Utility Storage Site 1A. Structural steel members shall be supported on storage bunkers inorder that steel is not allowed to lie on the ground surface. Bolts, plates and miscellaneous hardware shall be crated in wooden crates and labeled as to their contents.

3.2 SWITCHES

A. All switches including bypass switches, group operated switches, and all miscellaneous substation switches shall be removed, crated, labeled, and moved to Utility Storage Site 1A. Switches shall be crated as complete assemblies.

3.3 CIRCUIT RECLOSERS AND VOLTAGE REGULATORS

- A. Circuit reclosers shall be lowered into their transport configuration, moved to Utility Storage Site 1B, and placed on the existing concrete surface.
- B. Voltage regulators shall be moved to Utility Storage Site 1B and placed on the existing concrete surface.

3.4 ANGLE AND STRING BUS

A. Substation angle and string bus shall be removed and moved to Utility storage site 1A.

3.5 SUBSTATION FENCING

- A. Substation fencing fabric shall be removed, rolled up, and moved to Utility Storage Site 1A.
- B. Substation fence gates and hardware shall be crated and moved to Utility Storage Site 1A.
- C. The north substation fence line shall remain intact.

3.6 POWER TRANSFORMER

A. The substation power transformer along with the high-side lighting transformer and equipment shall remain the property of and be removed by Xcel Energy Company prior to start of the work.

3.7 MONITORING AND CONTROL AND MISCELLANEOUS EQUIPMENT

- A. All monitoring and control equipment housed within the substation control building shall remain the property of and be removed by the Water & Light Department of the City of East Grand Forks, Minnesota.
- B. Miscellaneous equipment such as primary junction box, step-up and station power transformers, and padmounted switch shall remain the property of and be removed by the Water & Light Department of the City of East Grand Forks, Minnesota.

3.8 METAL METERING BUILDING

- A. The metal metering building shall be removed and become the property of the Contractor.
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SECTION 16239

ENGINE RADIATOR AIRFLOW-COOLED LOAD BANK

06/02

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SECTION 16239

ENGINE RADIATOR AIRFLOW-COOLED LOAD BANK 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

UNDERWRITERS LABORATORIES (UL)

UL 1030

(1994) Sheathed Heating Elements Sixth Edition

1.2 SYSTEM DESCRIPTION

Provide engine radiator airflow-cooled, resistive load bank for permanent, on-site installation as a component for each Government-furnished standby engine generator system. The load bank shall be designed for local control, with automatic and manual operation capability. The load bank shall bear the listing mark of Underwriters Laboratories (UL Listing).

1.3 WARRANTY

The load bank shall be supplied with a 2-year manufacturer's warranty, which covers all materials and service labor. The manufacturer shall demonstrate the availability of factory service technicians in support of the load bank.

1.4 MANUFACTURER'S QUALIFICATIONS

The load bank shall be a product of a firm regularly engaged in the design and manufacture of generator load banks. The load bank manufacturer shall demonstrate at least five years experience, with at least twenty-five successful installations of load banks, similar or equal to the load banks specified herein.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

Simplex LBD Series, or other approved equal.

2.2 ELECTRICAL CONNECTION

Power source to load bank connection shall be 3-phase, 3-wire plus ground. Additional control wire connections for remote control as required.

2.3 LOAD BANK RATING

Provide the load bank with a capacity of 50 kW, 1.0 p.f.

2.3.1 Load Bank

Load banks shall be rated for 50 percent of total generator rating. Load steps shall be in manufacturer's suggested increments, in order to obtain specific rating. Voltage shall be 480 volts ac, three-phase, 4-wire. Frequency shall be 60 Hertz. Air intake temperature shall be 155 degrees F max (radiator air outflow). Provide radiator air outflow. Load bank shall have continuous duty cycle, air temperature rise of 100 degrees F, nominal, and an air back pressure of 0.25-0.50 inch water column.

2.4 LOAD BANK DESIGN

The load bank shall be a completely self-contained unit which includes all resistive load elements, load control devices, load element branch circuit fuse protection, main load bus and terminals, control terminals, system protection devices and NEMA enclosure of required type. The load bank shall be the manufacturer's standard product that has been investigated, tested and listed by Underwriters Laboratories, as a system for the purpose intended. Simple assemblies of listed parts that are not system UL listed shall not be acceptable.

2.4.1 Enclosure

NEMA Type 1, galvanized steel, unit construction, consisting of a power section, for installation and wiring of the load elements and a control section for installation and wiring of control components. The control section is to be physically and thermally isolated from both the hot load elements and the heated airflow. Load Bank shall be provided with adjustable height, floor mounting adaptors, for independent support of unit. Ductwork shall be supported separately. Load bank shall also be provided with a flexible isolating transition from the generator radiator, along with sheet metal duct on both sides of the load bank as shown on drawings.

2.4.2 Load Elements

Load elements shall be in accordance with UL 1030, labeled or recognized, totally enclosed, sealed and weather-proof with an electrically grounded outer sheath such that the element can not be electrically short-circuited by external foreign objects and personnel are protected against accidental electrical shock. Elements shall be individually replaceable. Open wire type elements in which the electrically live conductors are exposed and which can be short circuited to each other or to ground by foreign objects or by the breakage of an element or an element support shall not be permitted.

2.4.3 Load Element Short Circuit Protection

Branch circuit fuses, per each 50 kW load branch circuit. Fuses shall be

200,000 A.I.C current limiting type.

2.4.4 Load Control

One magnetic contactor per each fused branch circuit.

2.4.5 Power Wiring

Load bank power wiring shall be 302 degrees F insulated.

2.4.6 Main Terminals

Barrier type power terminal block with compression type terminal to accept stranded building wire. Provide chassis ground stud with compression type terminal.

2.4.7 Control Wiring

Control wiring shall be 221 degrees F insulated.

2.4.8 Control Power

Control power shall be derived internally from the main load bus. Control and protective circuits shall operate at 120 volts via control power transformer or line-neutral circuit and shall be fused.

2.4.9 System Protection

The load bank shall include a comprehensive protection system to protect against overheating. The system shall function to disconnect the load elements from the power source and activate an alarm upon sensing an exhaust air temperature greater than 300 degrees F.

2.5 LOCAL CONTROL PANEL

Control panel shall be NEMA 1 for automatic and manual operation. The panel shall include:

- a. Control power on-off pushbuttons.
- b. Automatic and Manual operation switch.
- c. "Normal operation" indicator lamp.
- d. Master load control switch.
- e. Load step control switches.
- f. "Cooling failure" alarm indicator lamp.

2.6 AUTOMATIC LOAD BANK CONTROLLER

The load bank shall be equipped with an automatic controller that has three modes of operation: Off, Manual, and Automatic. The load bank controller

shall sense and display load kilowatts in both operational modes.

- a. The normal operating position will be in the off mode. In this mode the load bank shall be off-line.
- b. In automatic, the load bank shall be on-line when the generator is being exercised. In this mode the controller will determine that the generator is in operation and then gradually add steps of load until a 50% load is achieved and maintained. When the exercise period has been completed the controller will gradually decrease the load and then provide a generator shut down command.
- c. In manual, the load bank shall be on-line when the generator is being exercised. In this mode the operator will determine that the generator is in operation and then add steps of load until a 50% load is achieved and maintained. When the exercise period has been completed the operator will decrease the load and then provide a generator shut down command.

PART 3 EXECUTION

3.1 INSTALLATION

The load bank shall be installed within the air outflow of the engine unit mounted radiator and shall be cooled by the radiator airflow. Install load bank within radiator exhaust air duct. Provide flexible transition from radiator to duct and solid duct transition to load bank and outlet control dampers.

3.2 MANUFACTURER'S FIELD SERVICES

Provide manufacturer's field representative for one day start-up service, for installation of the load bank, on site, after the load bank has been installed and connected.

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SECTION 16264

DIESEL GENERATOR INSTALLATION

06/02

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SECTION 16264

DIESEL GENERATOR INSTALLATION 06/02

PART 1 GENERAL

1.1 SCOPE

This section covers the furnishing and installing of the necessary ductwork, exhaust system, electrical connections, and any other power distribution equipment as shown and specified herein to complete the installation of Government Furnished Generator for the pump station as indicated on the drawings. The handling, installing, connecting and testing of this Government-furnished generator, connection to the electrical distribution system, the standby generator cooling removal system, engine exhaust and other associated equipment including installation of the Government Furnished Equipment (GFE) automatic transfer switch, are also part of the Contractor's work under this section.

1.2 RELATED WORK OF OTHER SECTIONS

The following items of related work are covered under other Sections:

- (1) Painting: SECTION: 09900: PAINTING, GENERAL.
- (2) Government-furnished equipment: SECTION 01000: GENERAL.
- (3) Grounding and Bonding: SECTION 16415: ELECTRICAL WORK, INTERIOR.
- (4) Louvers, dampers, ductwork and insulation: SECTION 15500: HEATING AND VENTILATING SYSTEMS.
- (5) Load bank: SECTION 16239: ENGINE RADIATOR AIRFLOW-COOLED LOAD BANK

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

American National Standards Institute (ANSI)

ANSI C2 (1997) National Electrical Safety Code

National Electrical Manufacturers Association (NEMA)

NEMA AB 1 (1993) Molded Case Circuit Breakers and Molded Case Switches

NEMA ICS 1	(1993) Industrial Control and Systems
NEMA ICS 2	(1993) Industrial Control Devices, Controllers and Assemblies
NEMA ICS 3	(1993) Industrial Systems
NEMA ICS 4	(1993) Industrial Control and Systems Terminal Blocks
National Fire Protection	n Association (NFPA)
NFPA 70	(1996) National Electrical Code
Underwriters Laboratori	es, Inc. (UL)
UL 03	(1996) Electrical Construction Materials Directory (with Quarterly Supplements)
UL 67	(1993) Panelboards
UL 98	(1994, Rev Feb,1995) Enclosed and Dead-Front Switches
UL 198C	(1986; Rev thru Jun 1993) High-Interrupting-Capacity Fuses, Current-Limiting Types
UL 198H	(1988; Rev thru Nov 1993) Class T Fuses
UL 467	(1993) Grounding and Bonding Equipment
UL 489	(1996; Rev May 1997) Molded-Case Circuit Breakers and Circuit-Breaker Enclosures
UL 506	(1994; Rev Jul 1994) Specialty Transformers
UL 508	(1993) Industrial Control Equipment
UL 845	(1995) Motor Control Centers
869A	(1993; Rev Apr 1994) Reference Standard for Service Equipment
UL 891	(1994; Rev thru Jan 1995) Dead-Front Switchboards
UL 943	(1993; Rev thru Jan 1995) Ground-Fault Circuit Interrupters

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation;

submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Equipment and Materials Shop Drawings; GA.

Shop drawings shall be submitted for approval and shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical data; catalog cuts; and any special installation instructions that may be required. Shop drawings shall be submitted for all materials and equipment specified.

SD-04 Drawings

Cooling Air Ductwork Shop Drawings; GA

Cooling air ductwork shop drawings. Drawings shall be provided that indicate sizes and physical configuration of the louvers, dampers, and ductwork required to connect the GFE generator and load bank into the pump station as shown on the drawings. Flexible duct connector shall be indicated with materials, construction, and location.

Exhaust System Drawings; GA

Drawings shall be provided that indicate sizes and physical configuration of the exhaust system.

Anchor bolt drawings and layout; GA

Anchor bolts, washers, and nuts shall be submitted with a layout indicating location, size, overall length, and configuration.

SD-01 Data

List of Equipment and MaterialsSD-; FIO

List of Equipment and Materials. A complete list of accessory equipment and materials proposed (such as anchor bolts, exhaust components, etc), containing an adequate description of each separate item of equipment or materials recommended for approval, shall be furnished. The quantity of each item described shall be indicated.

SD-13 Certificates

Equipment and Material Certificates; GA.

Certificates of compliance will be accepted as proof of compliance when equipment or materials are required to conform to UL standards, or to be manufactured and/or tested by NEMA standards. Such certificates are not required if manufacturer's published data submitted and approved reflect a UL listing or conformance with applicable publications of the NEMA. Otherwise, evidence of a UL listing, or conformance with applicable NEMA

standards, shall be submitted, as appropriate. Proof of the listing by the UL, or conformance with the applicable publications of the NEMA, does not relieve the Contractor of compliance with other provisions of these specifications.

For other than equipment and materials specified to conform to UL publications, a manufacturer's statement indicating complete compliance with the applicable Federal Specification, or standard of ASTM, NEMA, or other commercial standard, is acceptable.

SD-06 Instructions and SD-19 Operation and Maintenance Manuals

Instruction Manuals; GA.

The instruction manuals shall be furnished to the Government following the completion of factory tests and shall include assembly, installation, operation and maintenance instructions, spare parts data which provide supplier name, current cost, catalog order number, and a recommended list of spare parts to be stocked and documents submitted and approved. Manuals also include data outlining step-by-step procedures for system startup and operation, and a troubleshooting guide which lists possible operational problems and corrective action to be taken. A brief description of all equipment and their basic operating features are also included. Documents are bound in a suitable binder adequately marked or identified on the spine and front cover. A table of contents page has been included and marked with pertinent supply contract information and contents of the manual. Tabs are provided to separate different types of documents, such as catalog ordering information, drawings, instructions, and spare parts data. Index sheets are provided for each section of the manual when warranted by the quantity of documents included under separate tabs or dividers. The Contractor may utilize the two copies for the duration of start-up and testing of generator systems. Instruction Manuals shall be returned to the Government after generator equipment.

SD-04 Drawings

Exhaust System Drawings; GA

Exhaust System from muffler outlet. Shop drawings shall be provided that indicate the pipe layout, materials, hangers, roof thimble, drip leg, and beveled exhaust elbow. The drawings shall indicate exhaust pipe route to avoid interference with the monorail hoist and cable reel system.

PART 2 PRODUCTS

2.1 GENERAL

2.1.1 Standard Product

Material and equipment utilized in the installation shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 5 years prior to bid opening. The experience use shall include applications of equipment and materials under similar

circumstances and of the same design and rating as the equipment specified.

2.1.2 Identification Nameplates

Major items of electrical equipment and major components shall be permanently marked with an identification name to identify the equipment by type or function and specific unit number as indicated. Unless otherwise specified, all identification nameplates shall be made of laminated plastic in accordance with Fed. Spec. L-P-387 with black outer layers and a white core. Edges shall be chamfered. Plates shall be fastened with black-finished round-head drive screws or approved non-adhesive metal fasteners. When the nameplate is to be installed on an irregular shaped object, the Contractor shall devise an approved support suitable for the application. In all instances, the nameplate shall be installed in a conspicuous location. At the option of the Contractor, the equipment manufacturer's standard embossed nameplate material with black paint-filled letters may be furnished in lieu of laminated plastic.

2.1.3 Code Compliance

The installation shall comply with the requirements and recommendations of NFPA 70 and ANSI C2.

2.1.4 Coordination

The drawings indicate the extent and the general location and arrangement of equipment, conduit, and wiring. The Contractor shall become familiar with all details of the work and verify all dimensions in the field so that the outlets and equipment will be properly located and readily accessible. The Contractor is responsible for coordinating with the Government furnished equipment supplier to gain a full understanding of the manuals and other documentation provided, and the equipment installation procedures. If any conflict occurs necessitating departures from the drawings, details of and reasons for departures shall be submitted and approved prior to implementing any change.

2.1.5 Verification of Dimensions

The Contractor shall become familiar with details of the work, shall verify dimensions in the field, and shall advise the Contracting Officer of any discrepancy or conflicts before performing any work.

2.2 MATERIALS

2.2.1 Workmanship

Materials and equipment shall be installed in accordance with recommendations of the manufacturer and as shown.

2.2.2 Materials and Equipment

Materials and equipment shall conform to the respective publications and other requirements specified below. Materials and equipment not listed below shall be as specified elsewhere in this section.

2.2.3 Ductwork

All ductwork shall be made from galvanized steel sheets. All ductwork shall comply with SMACNA HVAC Duct Construction Standards. All ductwork shall be substantially airtight with no audible leaks, reinforced or crimped to prevent "panning" at system start-up and good rigid connections to louvers and dampers.

2.2.4 Flexible Connector

The engine-generator shall be connected to the ductwork utilizing a flexible duct connector made of either fiberglass or neoprene strips bound to galvanized metal strips on each side. Duct connector shall be submitted for approval by the Contracting Officer's Representative.

2.2.5 Exhaust Pipe

The exhaust pipe from the muffler outlet to discharge elbow on the end of the exhaust system shall be made of stainless steel. Stainless steel shall be Schedule 10. Exhaust pipe shall be furnished between the flexible connector and the muffler in stainless steel.

2.2.6 Anchor Bolts

The Contractor shall provide anchor bolts for the engine generator set to be installed under this contract. The sizes and locations shall be as shown on the Government furnished shop drawings for the "C" channel under the fuel tank. Anchor bolts and associated flat washer shall be of stainless steel material and nuts shall be of silicon bronze material. Anchor bolt drawings and layout shall be submitted for approval.

2.2.7 Equipment Pad

2.2.7.1 Equipment Pad

The Contractor shall install a concrete equipment pad under the engine generator set of approximately 59" wide by 139" long that forms a pad of 3 to 5 inch thick concrete above the finish floor. The finish floor shall be abraded or bonding agent added before pad placement. The pad shall be so located to place the generator near the monorail hoist centerline, while maintaining sufficient space for electrical panel clearance and provide space for ductwork between the engine radiator and the damper/louver unit in the wall. The anchor bolts for the engine generator shall extend through the pad approximately 4 inches into the station floor. The pad shall be reinforced with steel and submitted for approval to the Contracting Officer's Representative. The anchor bolts, specified in Paragraph: Anchor Bolts above, shall be suitable for use with the Government furnished equipment vibration isolators and Contractor provided equipment pad.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Layout

The Contractor shall furnish a plan and elevation layout for the pump station that indicates centerline of the skid-mounted generator unit with all anchorage, vibration isolation, engine exhaust components and engine cooling ductwork shown. Load bank as specified in Section 16239: ENGINE RADIATOR AIRFLOW-COOLED LOAD BANK shall be indicated in the layout. The location of the load bank between the radiator and damper/louver at the wall shall be shown. The location of the overhead monorail hoist shall also be indicated. All ductwork shall be submitted for approval after the layout is approved.

3.1.1.1 Anchor Bolts

Anchor bolts may be installed after pad placement with a core drilled hole and stainless steel threaded rod in epoxy grouted anchorage before setting of the engine generator set. A template shall be utilized to insure accurate location of the anchors before drilling and placement. The epoxy anchorage system shall be submitted for approval.

3.1.2 Exhaust System

The exhaust system shall be installed to avoid interference with the overhead monorail hoist and roof truss system. All exhaust piping shall be insulated to protect occupants from burns or deterioration to adjacent equipment. The 24" long flexible exhaust connector and the muffler shall not be insulated. Final location of all exhaust system components, insulation system shall be submitted for approval. Exhaust pipe insulation material and installation shall be in accordance with Section 15500:

3.1.3 Field Painting

Ferrous surfaces shall be cleaned and painted. Surfaces to be painted shall be free of all oil, grease, welding slag and spatter, mill scale, deleterious corrosion, dirt and other foreign substances. Painting shall include at least "touch-up" one coat of the generator manufacturer's paint system. If substantial bare metal has been exposed during installation, then a rust-inhibiting primer shall be applied to a clean, dry surface as soon as practicable after cleaning. Painting shall be manufacturer's standard material and process except that the total dry film thickness shall be not less than 2.5 mils. Color of the finish coat may be the manufacturer's standard color, if approved, or an approved ANSI 61 Gray. The finish shall be free from runs, sags, peeling or other defects.

3.1.4 Tests

After pump station installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating

test for approval of the installed engine generator system. The equipment shall be demonstrated to operate in accordance with the installation requirements of this specification. The test shall be performed in the presence of the Contracting Officer and representatives from the City of East Grand Forks. The Contractor shall furnish all instruments and personnel to assist the ONAN representative in conducting the required tests, and the Contractor shall furnish 50 gallons of diesel fuel.for testing purposes. The engine-generator manufacturer under a separate contract will furnish other consumable items, lubricants and coolants.

3.1.4.1 Automatic Transfer Switch

The Contractor shall demonstrate that all features of the Government-furnished automatic transfer switch are operational and properly interface with the Government-furnished generator and controls.

3.1.4.2 Louvers and Dampers

The Contractor shall demonstrate the dampers, motorized operators and louvers function correctly for supplying and exhausting air to the engine-generator unit, including testing and balancing of the system. Ambient outside, interior and exhaust air temperatures shall be monitored. Airflow over the louver faces shall be monitored over a minimum 12-point test grid on the louver surface. Temperatures shall continue to be monitored for 30 minutes after shut down. Temperatures and air flows will be measured using calibrated instruments accurate to within +/- 3% of actual readings.

3.1.4.3 Generator

The Contractor shall request from the Contracting Officer's Representative, the services of a ONAN manufacturers authorized field service engineer to supervise the start-up and testing of the Government-furnished generator, its auxiliary equipment and controls. The Contractor shall expect each test at each pump station to last not less than four hours or exceed 8 hours total time including set-up, preparation, test, and clean-up. The Contractor shall request the ONAN services at least fourteen calendar days in advance and group the pump station tests within the same time frame wherein possible. Services of the ONAN representative are provided under a separate contract and are not included in the work required in this contract.

3.2 SPARE PARTS

Spare parts do not apply to Government-furnished equipment.

Provide a complete set of accessories and special tools required to erect, handle, dismantle, test, and maintain electrical system apparatus.

Spare parts shall be identical in all respects to corresponding original equipment provided.

Spare Parts Required. (To be completed after FTR)

One pilot light with lens for each type provided.

One contactor auxiliary contact for each type provided.

3.3 QUALITY CONTROL

The Contractor shall establish and maintain a quality control program for work under this section to assure compliance with contract requirements, and he shall maintain records of his quality control for all construction operations including but not limited to the following:

- a. Inspection at worksite for damage and defects in material and equipment.
- b. Inspection at worksite to ensure use of specified material and equipment.
- c. Storage at the worksite.
- d. Installation, mounting and alignment of all equipment.
- e. Operational tests of all installed facilities.
- f. Maintenance after installation.

Two copies of the records of inspections and tests, as well as the records of corrective actions taken, shall be furnished to the Government as directed by the Contracting Officer. The Quality Control Plan shall be in accordance with SECTION 01451: CONTRACTOR QUALITY CONTROL.

-- End of Section --

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1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C12.1	(1995) Code for Electricity Metering
ANSI C12.4	(1984; R 1996) Mechanical Demand Registers
ANSI C12.10	(1997) Electromechanical Watthour Meters
ANSI C12.11	(1987; R 1993) Instrument Transformers for Revenue Metering, 10 kV BIL Through 350 kV BIL (0.6 kV NSV through 69 kV NSV)
ANSI C37.16	(1997) Low-Voltage Power Circuit Breakers and AC Power Circuit Protectors - Preferred Ratings, Related Requirements, and Application Recommendations
ANSI C39.1	(1981; R 1992) Requirements for Electrical Analog Indicating Instruments
ANSI C57.12.10	(1988) Safety Requirements for Transformers 230 kV and Below 833/958 Through 8333/10417 kVA, Single-Phase, and 750/862 Through 60 000/80 000/100 000 kVA, Three-Phase Without Load Tap Charging; and 3750/4687 Through 60 000/80 000/100 000 kVA With Load Tap Charging
ANSI C57.12.13	(1982) Conformance Requirements for Liquid-Filled Transformers Used in Unit Installations, Including Unit Substations
ANSI C57.12.27	(1982) Conformance Requirements for Liquid-Filled Distribution Transformers Used in Pad-Mounted Installations, Including Unit Substations

ANSI C57.12.50	(1981; R 1989) Ventilated Dry-type Distribution Transformers 1 to 500 kVA, Single-Phase; and 15 to 500 kVA, Three-Phase with High-Voltage 601 to 34 500 Volts, Low-Voltage 120 to 600 Volts
ANSI C57.12.51	(1981; R 1989) Ventilated Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34 500 Volts, Low-Voltage 208Y/120 to 4160 Volts
ANSI C57.12.52	(1981; R 1989) Sealed Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase with High-Voltage 601 to 34 500 Volts, Low-Voltage 208Y/120 to 4160 Volts
ANSI C57.12.70	(1978; R 1993) Terminal Markings and Connections for Distribution and Power Transformers
ANSI C78.1	(1991; C78.1a; R 1996) Fluorescent Lamps - Rapid-Start Types - Dimensional and Electrical Characteristics
ANSI C78.20	(1995) Electric Lamps - Characteristics of Incandescent Lamps A, G, PS, and Similar Shapes with E26 Medium Screw Bases
ANSI C78.21	(1995) Physical and Electrical Characteristics - Incandescent Lamps - PAR and R Shapes
ANSI C78.1350	(1990) 400-Watt, 100-Volt, S51 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1351	(1989) 250-Watt, 100-Volt S50 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1352	(1990) 1000-Watt, 250-Volt, S52 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1355	(1989) 150-Watt, 55-Volt S55 High-Pressure Sodium Lamps
ANSI C78.1375	(1996) 400-Watt, M59 Single-Ended Metal-Halide lamps
ANSI C78.1376	(1996) 1000-Watt, M47 Single-Ended Metal-Halide Lamps
ANSI C78.2A	(1991) 18 & 26- Watt, Compact Fluorescent Quad Tube Lamps

ANSI C78.2B	(1992) 9 & 13-Watt, Compact Fluorescent Quad Tube Lamps
ANSI C80.5	(1995) Rigid Aluminum Conduit
ANSI C82.1	(1997) Specifications for Fluorescent Lamp Ballasts
ANSI C82.4	(1992) Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
ANSI C135.30	(1988) Zinc-Coated Ferrous Ground Rods for Overhead or Underground Line Construction
AMERICAN SOCIETY FOR TH	ESTING AND MATERIALS (ASTM)
ASTM B 1	(1995) Hard-Drawn Copper Wire
ASTM B 8	(1999) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM D 709	(1992; R 1997) Laminated Thermosetting Materials
ASTM D 4059	(1996) Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography
CODE OF FEDERAL REGULA:	TIONS (CFR)
47 CFR 18	Industrial, Scientific, and Medical Equipment
INSTITUTE OF ELECTRICAL	L AND ELECTRONICS ENGINEERS (IEEE)
IEEE C2	(1997) National Electrical Safety Code
IEEE C37.13	(1990; R 1995) Low-Voltage AC Power Circuit Breakers Used in Enclosures
IEEE C37.20.1	(1993) Metal-Enclosed Low-Voltage Power Circuit-Breaker Switchgear
IEEE C57.12.00	(1993) IEEE Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
IEEE C57.12.80	(1996) Terminology for Power and Distribution Transformers
IEEE C57.12.90	(1993) Test Code for Liquid-Immersed Distribution, Power, and Regulating

	Transformers and Guide for Short-Circuit Testing of Distribution and Power Transformers
IEEE C57.13	(1993) Instrument Transformers
IEEE C57.98	(1993) Guide for Transformer Impulse Tests
IEEE C57.100	(1986; R 1992) Test Procedure for Thermal Evaluation of Oil-Immersed Distribution Transformers
IEEE C62.41	(1991; R 1995) Surge Voltages in Low-Voltage AC Power Circuits
IEEE Std 81	(1983) Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System (Part 1)
IEEE Std 242	(1986; R 1991) Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
IEEE Std 399	(1997) Recommended Practice for Industrial and Commercial Power Systems Analysis
NATIONAL ELECTRICAL MA	NUFACTURERS ASSOCIATION (NEMA)
NEMA 250	(1991) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA AB 1	(1993) Molded Case Circuit Breakers and Molded Case Switches
NEMA BU 1	
	(1994) Busways
NEMA FU 1	(1994) Busways (1986) Low Voltage Cartridge Fuses
NEMA FU 1	
	(1986) Low Voltage Cartridge Fuses
NEMA ICS 1	(1986) Low Voltage Cartridge Fuses (1993) Industrial Control and Systems (1993) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC
NEMA ICS 1 NEMA ICS 2	(1986) Low Voltage Cartridge Fuses (1993) Industrial Control and Systems (1993) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC (1993) Industrial Control and Systems

NEMA MG	1	(1993; Rev 1; Rev 2; Rev 3; Rev 4) Motors and Generators
NEMA MG	10	(1994) Energy Management Guide for Selection and Use of Polyphase Motors
NEMA OS	1	(1996) Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
NEMA OS	2	(1986; Errata Aug 1986; R 1991) Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
NEMA PB	1	(1995) Panelboards
NEMA PB	2	(1995) Deadfront Distribution Switchboards
NEMA PE	5	(1996) Utility Type Battery Chargers
NEMA RN	1	(1989) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA SG	3	(1995) Power Switching Equipment
NEMA ST	20	(1992) Dry-Type Transformers for General Applications
NEMA TC	2	(1990) Electrical Polyvinyl Chloride (PVC) Tubing (EPT) and Conduit (EPC-40 and EPC-80)
NEMA TC	13	(1993) Electrical Nonmetallic Tubing (ENT)
NEMA VE	1	(1996) Metal Cable Tray Systems
NEMA WD	1	(1983; R 1989) General Requirements for Wiring Devices
NEMA WD	6	(1988) Wiring Devices - Dimensional Requirements
	NATIONAL FIRE PROTECTION	N ASSOCIATION (NFPA)
NFPA 70		(1999) National Electrical Code
NFPA 101		(1997; Errata 97-1; TIA 97-1) Life Safety Code
	UNDERWRITERS LABORATORIE	ES (UL)
UL 1		(1993; Rev thru Jan 1995) Flexible Metal Conduit

UL 4	(1996) Armored Cable
UL 5	(1996) Surface Metal Raceways and Fittings
UL 6	(1997) Rigid Metal Conduit
UL 20	(1995; Rev thru Oct 1998) General-Use Snap Switches
UL 44	(1997; Rev Mar 1999) Thermoset-Insulated Wires and Cables
UL 50	(1995; Rev thru Oct 1997) Enclosures for Electrical Equipment
UL 67	(1993; Rev thru Nov 1995) Panelboards
UL 83	(1998) Thermoplastic-Insulated Wires and Cables
UL 98	(1994; R thru Jun 1998) Enclosed and Dead-Front Switches
UL 198B	(1995) Class H Fuses
UL 198C	(1986; Rev thru Feb 1998) High-Interrupting-Capacity Fuses, Current-Limiting Types
UL 198D	(1995) Class K Fuses
UL 198E	(1988; Rev Jul 1988) Class R Fuses
UL 198G	(1988; Rev May 1988) Fuses for Supplementary Overcurrent Protection
UL 198H	(1988; Rev thru Nov 1993) Class T Fuses
UL 198L	(1995; Rev May 1995) D-C Fuses for Industrial Use
UL 360	(1996; Rev thru Oct 1997) Liquid-Tight Flexible Steel Conduit
UL 467	(1993; Rev thru Aug 1996) Grounding and Bonding Equipment
UL 486A	(1997; Rev thru Dec 1998) Wire Connectors and Soldering Lugs for Use with Copper Conductors
UL 486B	(1997; Rev Jun 1997) Wire Connectors for Use with Aluminum Conductors

UL 486C	(1997; Rev thru Aug 1998) Splicing Wire Connectors
UL 486E	(1994; Rev thru Feb 1997) Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
UL 489	(1996; Rev thru Dec 1998) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
UL 498	(1996; Rev thru Sep 1998) Attachment Plugs and Receptacles
UL 506	(1994; Rev Oct 1997) Specialty Transformers
UL 508	(1999) Industrial Control Equipment
UL 510	(1994; Rev thru Apr 1998) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
UL 512	(1993; R Dec 1995) Fuseholders
UL 514A	(1996; Rev Jul 1998) Metallic Outlet Boxes
UL 514B	(1997; Rev Oct 1998) Fittings for Cable and Conduit
UL 514C	(1996; R Sep 1998) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 542	(1994; Rev thru Jul 1998) Lampholders, Starters, and Starter Holders for Fluorescent Lamps
UL 651	(1995; Rev thru Oct 1998) Schedule 40 and 80 Rigid PVC Conduit
UL 651A	(1995; Rev thru Apr 1998) Type EB and A Rigid PVC Conduit and HDPE Conduit
UL 674	(1994; Rev thru Oct 1998) Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations
UL 698	(1999)) Industrial Control Equipment for Use in Hazardous (Classified) Locations
UL 719	(1999) Nonmetallic-Sheathed Cables
UL 797	(1993; Rev thru Mar 1997) Electrical Metallic Tubing

UL	817	(1994; Rev thru Jul 1998) Cord Sets and Power-Supply Cords
UL	844	(1995; Rev thru Aug 1997) Electric Lighting Fixtures for Use in Hazardous (Classified) Locations
UL	845	(1995; Rev Feb 1996) Motor Control Centers
UL	854	(1996; Rev Apr 1998) Service-Entrance Cables
UL	857	(1994; Rev thru May 1999) Busways and Associated Fittings
UL	869A	(1998) Reference Standard for Service Equipment
UL	877	(1993; Rev thru May 1997) Circuit Breakers and Circuit-Breaker Enclosures for Use in Hazardous (Classified) Locations
UL	886	(1994; Rev thru Apr 1999) Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations
UL	891	(1994; Rev thru Jan 1995) Dead-Front Switchboards
UL	916	(1998) Energy Management Equipment
UL	924	(1995; Rev thru Oct 97) Emergency Lighting and Power Equipment
UL	935	(1995; Rev thru Oct 1998)Fluorescent-Lamp Ballasts
UL	943	(1993; Rev thru May 1998)Ground-Fault Circuit-Interrupters
UL	1004	(1994; Rev thru Dec 1997) Electric Motors
UL	1010	(1995; Rev thru Dec 1996)Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations
UL	1022	(1998) Line Isolation Monitors
UL	1029	(1994; Rev thru Dec 1997) High-Intensity-Discharge Lamp Ballasts
UL	1047	(1995; Rev Jul 1998) Isolated Power Systems Equipment

UL 1236	(1994; Rev thru Dec 1997) Battery Chargers for Charging Engine-Starter Batteries
UL 1242	(1996; Rev Mar 1998) Intermediate Metal Conduit
UL 1449	(1996; Rev thru Oct 1998) Transient Voltage Surge Suppressors
UL 1564	(1993; Rev Sep 1998) Industrial Battery Chargers
UL 1569	(1995; Rev thru Sep 1998) Metal-Clad Cables
UL 1570	(1995; Rev thru Jun 1997) Fluorescent Lighting Fixtures
UL 1571	(1995; Rev thru Jun 1997) Incandescent Lighting Fixtures
UL 1572	(1995; Rev thru Jun 1997) High Intensity Discharge Lighting Fixtures
UL 1660	(1994; Rev Apr 1998) Liquid-Tight Flexible Nonmetallic Conduit
UL Elect Const Dir	(1998) Electrical Construction Equipment Directory

1.2 GENERAL

1.2.1 Rules

The installation shall conform to the requirements of NFPA 70 and NFPA 101, unless more stringent requirements are indicated or shown.

1.2.2 Coordination

The drawings indicate the extent and the general location and arrangement of equipment, conduit, and wiring. The Contractor shall become familiar with all details of the work and verify all dimensions in the field so that the outlets and equipment shall be properly located and readily accessible. The Contractor is responsible for coordinating with the Government furnished equipment supplier to gain a full understanding of the installation manuals and procedures provided. Lighting fixtures, outlets, and other equipment and materials shall be carefully coordinated with mechanical or structural features prior to installation and positioned according to architectural reflected ceiling plans; otherwise, lighting fixtures shall be symmetrically located according to the room arrangement when uniform illumination is required, or asymmetrically located to suit conditions fixed by design and shown. Raceways, junction and outlet boxes, and lighting fixtures shall not be supported from sheet metal roof decks. If any conflicts occur necessitating departures from the drawings, details

of and reasons for departures shall be submitted and approved prior to implementing any change. The Contractor shall coordinate the electrical requirements of the mechanical work and provide all power related circuits, wiring, hardware and structural support, even if not shown on the drawings.

1.2.3 Special Environments

1.2.3.1 Weatherproof Locations

Wiring, Fixtures, and equipment in designated locations shall conform to NFPA 70 requirements for installation in damp or wet locations.

1.2.3.1 Ducts, Plenums and Other Air-Handling Spaces

Wiring and equipment in ducts, plenums and other air-handling spaces shall be installed using materials and methods in conformance with NFPA 70unless more stringent requirements are indicated in this specification or on the contract drawings.

1.2.4 Standard Products

Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

1.2.5 Nameplates

1.2.5.1 Identification Nameplates

Major items of electrical equipment and major components shall be permanently marked with an identification name to identify the equipment by type or function and specific unit number as indicated. Designation of motors shall coincide with their designation in the motor control center or panel. Unless otherwise specified, identification nameplates shall be made of laminated plastic in accordance with ASTM D 709 with black outer layers and a white core. Edges shall be chamfered. For locations where the name plate will be exposed to the weather, out of doors, the name plate shall be embossed and filled metal. Plates shall be fastened with black-finished round-head drive screws, except motors, or approved nonadhesive metal fasteners. When the nameplate is to be installed on an irregular-shaped object, the Contractor shall devise an approved support suitable for the application and ensure the proper installation of the supports and nameplates. In all instances, the nameplate shall be installed in a conspicuous location. At the option of the Contractor, the equipment manufacturer's standard embossed nameplate material with black paint-filled letters may be furnished in lieu of laminated plastic. The front of each panelboard, motor control center, switchgear, and switchboard shall have a nameplate to indicate the phase letter, corresponding color and arrangement of the phase conductors. The following equipment, as a minimum, shall be provided with identification nameplates:

Minimum 1/4 inch High Letters

Panelboards
Starters
Safety Switches
Motor Control Centers
Transformers
Equipment Enclosures
Switchgear
Switchboards
Motors

Minimum 1/8 inch High Letters

Control Power Transformers Control Devices Instrument Transformers

Each panel, section, or unit in motor control centers, switchgear or similar assemblies shall be provided with a nameplate in addition to nameplates listed above, which shall be provided for individual compartments in the respective assembly, including nameplates which identify "future," "spare," and "dedicated" or "equipped spaces."

1.2.6 As-Built Drawings

Following the project completion or turnover, within 30 days the Contractor shall furnish 2 sets of as-built drawings to the Contracting Officer.

1.3 SUBMITTALS

Government approval is required for submittals with a "Ga" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Manufacturer's Catalog; GA.

Data composed of catalog cuts, brochures, circulars, specifications, product data, and printed information in sufficient detail and scope to verify compliance with the requirements of the contract documents.

Material, Equipment, and Fixture Lists; FIO.

A complete itemized listing of equipment and materials proposed for incorporation into the work. Each entry shall include an item number, the quantity of items proposed, and the name of the manufacturer of each item.

SD-04 Drawings

As-Built Drawings; GA.

The as-built drawings shall be a record of the construction as installed. The drawings shall include all the information shown on the contract drawings, deviations, modifications, and changes from the contract drawings, however minor. The as-built drawings shall be kept at the job

site and updated daily. The as-built drawings shall be a full-sized set of prints marked to reflect all deviations, changes, and modifications. The as-built drawings shall be complete and show the location, size, dimensions, part identification, and other information. Additional sheets may be added. The as-built drawings shall be jointly inspected for accuracy and completeness by the Contractor's quality control representative and by the Contracting Officer prior to the submission of each monthly pay estimate. Upon completion of the work, the Contractor shall submit three full sized sets of the marked prints to the Contracting Officer for approval. If upon review, the as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for correction. The Contractor shall correct and return the as-built drawings to the Contracting Officer for approval within ten calendar days from the time the drawings are returned to the Contractor.

SD-08 Statements

SD-13 Certificates

Materials and Equipment; FIO.

The label or listing of the Underwriters Laboratories, Inc.., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted. However, materials and equipment installed in hazardous locations must bear the UL label unless the data submitted from other testing agency is specifically approved in writing by the Contracting Officer. Items which are required to be listed and labeled in accordance with Underwriters Laboratories must be affixed with a UL label that states that it is UL listed. No exceptions or waivers will be granted to this requirement. Materials and equipment will be approved based on the manufacturer's published data.

For other than equipment and materials specified to conform to UL publications, a manufacturer's statement indicating complete compliance with the applicable standard of the American Society for Testing and Materials, National Electrical Manufacturers Association, or other commercial standard, is acceptable.

1.4 WORKMANSHIP

Materials and equipment shall be installed in accordance with NFPA 70, recommendations of the manufacturer, and as shown.

PART 2 PRODUCTS

Products shall conform to the respective publications and other requirements specified below. Materials and equipment not listed below shall be as specified elsewhere in this section. Items of the same classification shall be identical including equipment, assemblies, parts, and components.

2.1 CABLES AND WIRES

Conductors No. 8 AWG and larger diameter shall be stranded. Conductors No. 10 AWG and smaller diameter shall be solid, except that conductors for remote control, alarm, and signal circuits, classes 1, 2, and 3, shall be stranded unless specifically indicated otherwise. Conductor sizes and ampacities shown are based on copper, unless indicated otherwise. All conductors shall be copper.

2.1.1 Equipment Manufacturer Requirements

When manufacturer's equipment requires copper conductors at the terminations or requires copper conductors to be provided between components of equipment, provide copper conductors or splices, splice boxes, and other work required to meet manufacturer's requirements.

2.1.2 Aluminum Conductors

Aluminum conductors shall not be used.

2.1.3 Insulation

2.1.3.1 Pumping Facilities

Unless indicated otherwise, or reqquired by NFPA70, power and lighting wires shall be 600-volt, type RHW-2 conforming to SECTION 16120: INSULATED WIRE AND CABLE of these specifications.

2.1.3.2 Recreation and Office Facilities

Unless indicated otherwise, or required by NFPA 70, power and lighting wires shall be 600-volt, Type THWN, THHN, or THW conforming to UL 83, except that grounding wire may be type TW conforming to UL 83; remote-control and signal circuits shall be Type TW, THW or TF, conforming to UL 83. Where lighting fixtures require 90-degree Centigrade (C) conductors, provide only conductors with 90-degree C insulation or better.

2.1.4 Bonding Conductors

ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

2.1.5 Service Entrance Cables

Service entrance (SE) and underground service entrance (USE) cables, UL 854.

2.1.6 Non-Metallic Sheathed Cable

UL 719, type NM or NMC.

2.1.7 Cord Sets and Power Supply Cords

UL 817.

2.2 CIRCUIT BREAKERS

2.2.1 MOLDED-CASE CIRCUIT BREAKERS

Molded-case circuit breakers shall conform to NEMA AB 1 and UL 489and UL 877 for circuit breakers and circuit breaker enclosures located in hazardous (classified) locations. Circuit breakers may be installed in panelboards, switchboards, enclosures, motor control centers, or combination motor controllers.

2.2.1.1 Construction

Circuit breakers shall be suitable for mounting and operating in any position. Lug shall be listed for copper and aluminum conductors in accordance with UL 486E. Single-pole circuit breakers shall be full module size with not more than one pole per module. Multi-pole circuit breakers shall be of the common-trip type having a single operating handle such that an overload or short circuit on any one pole will result in all poles opening simultaneously. Sizes of 100 amperes or less may consist of single-pole breakers permanently factory assembled into a multi-pole unit having an internal, mechanical, nontamperable common-trip mechanism and external handle ties. All circuit breakers shall have a quick-make, quick-break over-center toggle-type mechanism, and the handle mechanism shall be trip-free to prevent holding the contacts closed against a short-circuit or sustained overload. All circuit breaker handles shall assume a position between "ON" and "OFF" when tripped automatically. All ratings shall be clearly visible.

2.2.1.2 Ratings

Voltage ratings shall be not less than the applicable circuit voltage. The interrupting rating of the circuit breakers shall be at least equal to the available short-circuit current at the line terminals of the circuit breaker and correspond to the UL listed integrated short-circuit current rating specified for the panelboards and switchboards. Molded-case circuit breakers shall have nominal voltage ratings, maximum continuous-current ratings, and maximum short-circuit interrupting ratings in accordance with NEMA AB 1. Ratings shall be coordinated with system X/R ratio.

2.2.1.3 Cascade System Ratings

Circuit breakers used in series combinations shall be in accordance with UL 489. Equipment, such as switchboards and panelboards, which house series-connected circuit breakers shall be clearly marked accordingly. Series combinations shall be listed in the UL Recognized Component Directory under "Circuit Breakers-Series Connected."

2.2.1.4 Thermal-Magnetic Trip Elements

Thermal magnetic circuit breakers shall be provided as shown. Automatic operation shall be obtained by means of thermal-magnetic tripping devices located in each pole providing inverse time delay and instantaneous circuit

protection. The instantaneous magnetic trip shall be adjustable and accessible from the front of all circuit breakers on frame sizes above 150 amperes.

2.2.2 Solid-State Trip Elements

Solid-state circuit breakers shall be provided as shown. All electronics shall be self-contained and require no external relaying, power supply, or accessories. Printed circuit cards shall be treated to resist moisture absorption, fungus growth, and signal leakage. All electronics shall be housed in an enclosure which provides protection against arcs, magnetic interference, dust, and other contaminants. Solid-state sensing shall measure true RMS current with error less than one percent on systems with distortions through the 13th harmonic. Peak or average actuating devices are not acceptable. Current sensors shall be torodial construction, encased in a plastic housing filled with epoxy to protect against damage and moisture and shall be integrally mounted on the breaker. Where indicated on the drawings, circuit breaker frames shall be rated for 100 percent continuous duty. Circuit breakers shall have tripping features as shown on the drawings and as described below:

- a. Long-time current pick-up, adjustable from 50 percent to 100 percent of continuous current rating.
- b. Adjustable long-time delay.
- c. Short-time current pick-up, adjustable from 1.5 to 9 times long-time current setting.
- d. Adjustable short-time delay.
- e. Instantaneous current pick-up, adjustable from 1.5 to 9 times long-time current setting.
- f. Ground-fault pick-up, adjustable from 20 percent to 60 percent of sensor rating, but not greater than 1200 amperes. Sensing of ground-fault current at the main bonding jumper or ground strap will not be permitted.
- g. Adjustable ground-fault delay.
- h. Ground-fault I square times t switch.
- Overload and short-time and ground-fault trip indicators shall be provided.

2.2.3 SWD Circuit Breakers

Circuit breakers rated 15 amperes and intended to switch 277 volts or less fluorescent lighting loads shall be marked "SWD."

2.2.4 HACR Circuit Breakers

Circuit breakers 60 amperes or below, 240 volts, 1-pole or 2-pole, intended

to protect multi-motor and combination-load installations involved in heating, air conditioning, and refrigerating equipment shall be marked "Listed HACR Type."

2.2.5 Low-Voltage Power

a. Construction:

Low-voltage power circuit breakers shall conform to IEEE C37.13, ANSI C37.16, and NEMA SG 3 and shall be three-pole, single-throw, stored energy, manually operated, with drawout mounting. Solid-state trip elements which require no external power connections shall be provided. Circuit breakers shall have an open/close contact position indicator, charged/discharged stored energy indicator, primary disconnect devices, and a mechanical interlock to prevent making or breaking contact of the primary disconnects when the circuit breaker is closed. The circuit breaker enclosure shall be suitable for its intended location.

b. Ratings:

Voltage ratings shall be not less than the applicable circuit voltage. Circuit breakers shall be rated for 100 percent continuous duty and shall have trip current ratings and frame sizes as shown. Nominal voltage ratings, maximum continuous-current ratings, and maximum short-circuit interrupting ratings shall be in accordance with ANSI C37.16. Tripping features shall be as follows:

- 1. Long-time current pick-up, adjustable from 50 percent to 100 percent of sensor current rating.
- 2. Adjustable long-time delay.
- 3. Short-time current pick-up, adjustable from 1.5 to 9 times long-time current setting.
- 4. Adjustable short-time delay.
- 5. Instantaneous current pick-up, adjustable from 1.5 to 9 times long-time current setting.
- 6. Overload and short-circuit trip indicators shall be provided.

2.3 CONDUIT AND TUBING

2.3.1 Electrical, Zinc-Coated Steel Metallic Tubing (EMT)

UL 797

2.3.2 Electrical Nonmetallic Tubing (ENT)

NEMA TC 13.

2.3.3 Electrical Plastic Tubing and Conduit

NEMA TC 2.

- 2.3.4 Flexible Conduit, Steel and Plastic
 General-purpose type, UL 1; liquid tight, UL 360, and UL 1660.
- 2.3.5 Intermediate Metal Conduit
 UL 1242.
- 2.3.6 PVC Coated Rigid Steel Conduit
 NEMA RN 1.
- 2.3.7 Rigid Metal Conduit
 UL 6.
- 2.3.8 Rigid Plastic Conduit

 NEMA TC 2, UL 651 and UL 651A.
- 2.3.9 Surface Metal Electrical Raceways and Fittings
 UL 5.
- 2.4 CONDUIT AND DEVICE BOXES AND FITTINGS
- 2.4.1 Boxes, Metallic Outlet

NEMA OS 1 and UL 514A.

- 2.4.2 Boxes, Nonmetallic, Outlet and Flush-Device Boxes and Covers
 NEMA OS 2 and UL 514C.
- 2.4.3 Boxes, Outlet for Use in Hazardous (Classified) Locations UL 886.
- 2.4.4 Boxes, Switch (Enclosed), Surface-Mounted UL 98.
- 2.4.5 Fittings for Conduit and Outlet Boxes
 UL 514B.
- 2.4.6 Fittings For Use in Hazardous (Classified) Locations
 UL 886.
- 2.4.7 Fittings, PVC, for Use with Rigid PVC Conduit and Tubing

UL 514B.

2.5 CONDUIT COATINGS PLASTIC RESIN SYSTEM

NEMA RN 1, Type A-40.

- 2.6 CONNECTORS, WIRE PRESSURE
- 2.6.1 For Use With Copper Conductors

UL 486A.

2.7 ELECTRICAL GROUNDING AND BONDING EQUIPMENT

UL 467.

2.7.1 Ground Rods

Ground rods shall be of copper-clad steel conforming to UL 467 (3/4 inch) in diameter by (10 feet) in length of the sectional type driven full length into the earth.

2.7.2 Ground Bus

The ground bus shall be bare conductor or flat copper in one piece, if practicable.

2.8 ENCLOSURES

NEMA ICS 6 or NEMA 250 unless otherwise specified.

2.8.1 Cabinets and Boxes

Cabinets and boxes with volume greater than 100 cubic inches shall be in accordance with UL 50, hot-dip, zinc-coated, if sheet steel.

2.8.2 Circuit Breaker Enclosures

UL 489.

- 2.8.3 Circuit Breaker Enclosures for Use in Hazardous (Classified) Locations UL 877.
- 2.9 LIGHTING FIXTURES, LAMPS, BALLASTS, EMERGENCY EQUIPMENT, CONTROLS AND ACCESSORIES

The following specifications are supported and supplemented by information and details on the drawings. Additional fixtures, if shown, shall conform to this specification. Lighting equipment installed in classified hazardous locations shall conform to UL 844. Lamps, lampholders, ballasts, transformers, electronic circuitry and other lighting system components shall be constructed according to industry standards. Equipment shall be

tested and listed by a recognized independent testing laboratory for the expected installation conditions. Equipment shall conform to the standards listed below.

2.9.1 Lamps

Lamps shall be constructed to operate in the specified fixture, and shall function without derating life or output as listed in published data. Lamps shall meet the requirements of the Energy Policy Act of 1992.

- a. Incandescent and tungsten halogen lamps shall be designed for 125 volt operation (except for low voltage lamps), shall be rated for minimum life of 2,000 hours, and shall have color temperature between 2,800 and 3,200 degrees Kelvin. Tungsten halogen lamps shall incorporate quartz capsule construction. Lamps shall comply with ANSI C78.20 and sections 238 and 270 of ANSI C78.21.
- b. Fluorescent lamps shall have color temperature of 3,500 degrees Kelvin. They shall be designed to operate with the ballasts and circuitry of the fixtures in which they will be used. Fluorescent lamps, including spares, shall be manufactured by one manufacturer to provide for color and performance consistency. Fluorescent lamps shall comply with ANSI C78.1. Fluorescent tube lamp efficiencies shall meet or exceed the following requirements.

T8, 32 watts	(4' lamp)	2800 lumens
T12,34 watts	(4' lamp)	2800 lumens
T8,59 watts	(8' lamp)	5700 lumens
T12,60 watts	(8' lamp)	5600 lumens
T8/U,31-32 watts	(U-tube)	2600 lumens
T12/U,34 watts	(U-tube)	2700 lumens

- (1) Linear fluorescent lamps, unless otherwise indicated, shall be 4 feet long 32 watt T8, 265 mA, with minimum CRI of 75. Lamps of other lengths or types shall be used only where specified or shown. Lamps shall deliver rated life when operated on rapid-start ballasts.
- (2) Small compact fluorescent lamps shall be twin, double, or triple tube configuration as shown with bi-pin or four-pin snap-in base and shall have minimum CRI of 85. They shall deliver rated life when operated on ballasts as shown. 9 and 13 watt double tube lamps shall comply with ANSI C78.2B. 18 and 26 watt double tube lamps shall comply with ANSI C78.2A. Minimum starting temperature shall be 32 degrees F for twin tube lamps and for double and triple twin tube lamps without internal starter; and 15 degrees F for double and triple twin tube lamps with internal starter.
- (3) Long compact fluorescent lamps shall be 18, 27, 39, 40, 50, or 55 watt bi-axial type as shown with four-pin snap-in base;

- shall have minimum CRI of 85; and shall have a minimum starting temperature of 50 degrees F. They shall deliver rated life when operated on rapid-start ballasts.
- c. High intensity discharge lamps, including spares, shall be manufactured by one manufacturer in order to provide color and performance consistency. High intensity discharge lamps shall be designed to operate with the ballasts and circuitry of the fixtures in which they will be used and shall have wattage, shape and base as shown. High intensity discharge lamps, unless otherwise shown, shall have medium or mogul screw base and minimum starting temperature of -20 degrees F. Metal halide lamps, unless otherwise shown, shall have minimum CRI of 65; color temperature of 4,300 degrees Kelvin; shall be -BU configuration if used in base-up position; and shall be -H or high output configuration if used in horizontal position. Lamps shall comply with all applicable ANSI C78.1350, ANSI C78.1351, ANSI C78.1352, ANSI C78.1355, ANSI C78.1375, and ANSI C78.1376.

2.9.2 Ballasts and Transformers

Ballasts or transformers shall be designed to operate the designated lamps within their optimum specifications, without derating the lamps. Lamp and ballast combinations shall be certified as acceptable by the lamp manufacturer.

- a. Low voltage incandescent transformers shall be Class II UL listed 120/12 volt or 120/24 volt step-down transformers as required for the lamps shown. Transformers shall be high power factor type and shall be rated for continuous operation under the specified load. Transformers shall be encased or encased and potted, and mounted integrally within the lighting fixture unless otherwise shown.
- b. Fluorescent ballasts shall comply with ANSI C82.1 and shall be mounted integrally within fluorescent fixture housing unless otherwise shown. Ballasts shall have maximum current crest factor of 1.7; high power factor; Class A sound rating; maximum operating case temperature of 77 degrees F above ambient; and shall be rated Class P. Unless otherwise indicated, the minimum number of ballasts shall be used to serve each individual fixture. A single ballast may be used to serve multiple fixtures if they are continuously mounted, identically controlled and factory manufactured for that installation with an integral wireway.
 - (1) Compact fluorescent ballasts shall comply with IEEE C62.41 Category A transient voltage variation requirements and shall be mounted integrally within compact fluorescent fixture housing unless otherwise shown. Ballasts shall have minimum ballast factor of 0.95; maximum current crest factor of 1.6; high power factor; maximum operating case temperature of 77 degrees F above ambient; shall be rated Class P; and shall have a sound rating of Class A. Ballasts shall meet FCC Class A specifications for EMI/RFI emissions. Ballasts shall operate from nominal line voltage of 120 volts at 60 Hz and maintain constant light output

over a line voltage variation of \pm 10%. Ballasts shall have an end-of-lamp-life detection and shut-down circuit. Ballasts shall be UL listed and shall contain no PCBs. Ballasts shall contain potting to secure PC board, provide lead strain relief, and provide a moisture barrier.

(2) Electronic fluorescent ballasts shall comply with 47 CFR 18 for electromagnetic interference. Ballasts shall withstand line transients per IEEE C62.41, Category A. Ballasts shall have total harmonic distortion between 10 and 20%; minimum frequency of 20,000Hz; filament voltage between 2.5 and 4.5 volts; maximum starting inrush current of 20 amperes; and shall comply with the minimum Ballast Efficacy Factors shown in the table below. Minimum starting temperature shall be 50 degrees F). Ballasts shall carry a manufacturer's full warranty of three years, including a minimum \$10 labor allowance per ballast.

ELECTRONIC FLUORESCENT BALLAST EFFICACY FACTORS

LAMP TYPE	TYPE OF STARTER & LAMP	NOMINAL OPERATIONAL VOLTAGE	NUMBER OF LAMPS	MINIMUM BALLAST EFFICACY FACTOR
32W T8	rapid start linear & U-tubes	120 or 277 V	1 2 3 4	2.54 1.44 0.93 0.73
34W T12	rapid start linear & U-tubes	120 or 277 V	1 2 3	2.64 1.41 0.93
59W T8	rapid start linear	120 or 277 V	2	0.80
60W T12	rapid start linear	120 or 277 V	2	0.80

- c. High intensity discharge ballasts shall comply with UL 1029 and, if multiple supply types, with ANSI C82.4. Ballasts shall have minimum ballast factor of 0.9; high power factor; Class A sound rating; and maximum operating case temperature of 77 degrees F above ambient.
 - (1) Electronic high intensity discharge ballasts shall be constant wattage autotransformer type; shall have less than 10%

ballast loss; shall have total harmonic distortion between 10 and 20%; and shall have a minimum starting temperature of 0 degrees F.

(2) Magnetic high intensity discharge ballasts shall have a minimum starting temperature of -20 degrees F.

2.9.3 Fixtures

Fixtures shall be in accordance with the size, shape, appearance, finish, and performance shown. Unless otherwise indicated, lighting fixtures shall be provided with housings, junction boxes, wiring, lampholders, mounting supports, trim, hardware and accessories for a complete and operable installation. Recessed housings shall be minimum 20 gauge cold rolled or galvanized steel as shown. Extruded aluminum fixtures shall have minimum wall thickness of 0.125 inches. Plastic lenses shall be 100% virgin acrylic or as shown. Glass lenses shall be tempered. Heat resistant glass shall be borosilicate type. Conoid recessed reflector cones shall be Alzak with clear specular low iridescent finish.

- a. Incandescent fixture specular reflector cone trims shall be integral to the cone and shall be finished to match. Painted trim finishes shall be white with minimum reflectance of 88%. Low voltage incandescent fixtures shall have integral step-down transformers.
- b. Fluorescent fixtures shall comply with UL 1570. Recessed ceiling fixtures shall comply with NEMA LE 4. Fixtures shall be plainly marked for proper lamp and ballast type to identify lamp diameter, wattage, color and start type. Marking shall be readily visible to service personnel, but not visible from normal viewing angles. Fluorescent fixture lens frames on recessed and surface mounted troffers shall be one assembly with mitered corners. Parabolic louvers shall have a low iridescent finish and 45 degree cut-off. Louver intersection joints shall be hairline type and shall conceal mounting tabs or other assembly methods. Louvers shall be free from blemishes, lines or defects which distort the visual surface. Integral ballast and wireway compartments shall be easily accessible without the use of special tools. Housings shall be constructed to include grounding necessary to start the lamps. Open fixtures shall be equipped with a sleeve, wire guard, or other positive means to prevent lamps from falling. Medium bi-pin lampholders shall be twist-in type with positive locking position. Long compact fluorescent fixtures and fixtures utilizing U-bend lamps shall have clamps or secondary lampholders to support the free ends of the lamps.
- c. High intensity discharge fixture shall comply with UL 1572.

 Recessed ceiling fixtures shall comply with NEMA LE 4. Reflectors shall be anodized aluminum. Fixtures for horizontal lamps shall have position oriented lampholders. Lampholders shall be pulse-rated to 5,000 volts. Fixtures indicated as classified or rated for hazardous locations or special service shall be designed and independently tested for the environment in which they are installed. Recessed lens fixtures shall have extruded aluminum

lens frames. Ballasts shall be integral to fixtures and shall be accessible without the use of special tools. Remote ballasts shall be encased and potted. Lamps shall be shielded from direct view with a UV absorbing material such as tempered glass, and shall be circuited through a cut-off switch which will shut off the lamp circuit if the lens is not in place.

- d. Emergency lighting fixtures and accessories shall be constructed and independently tested to meet the requirements of applicable codes. Batteries shall be Nicad or equal with no required maintenance, and shall have a minimum life expectancy of five years and warranty period of three years.
- e. Exit Signs

Exit signs shall be ENERGY STAR compliant, thereby meeting the following requirements. Input power shall be less than 5 watts per face. Letter size and spacing shall adhere to NFPA 101. Luminance contrast shall be greater than 0.8. Average luminance shall be greater than 15 $\rm cd/m^2$ measured at normal (0 degree) and 45 degree viewing angles. Minimum luminance shall be greater than 8.6 $\rm cd/m^2$ measured at normal and 45 degree viewing angles. Maximum to minimum luminance shall be less than 20:1 measured at normal and 45 degree viewing angles. The manufacturer warranty for defective parts shall be at least 5 years.

2.9.4 Lampholders, Starters, and Starter Holders

UL 542

2.9.5 Ultrasonic, and Passive Infrared Occupancy Sensors

UL 916

- 2.10 LOW-VOLTAGE FUSES AND FUSEHOLDERS
- 2.10.1 Fuses, Low Voltage Cartridge Type

NEMA FU 1.

2.10.2 Fuses, High-Interrupting-Capacity, Current-Limiting Type

Fuses, Class G, J, L and CC shall be in accordance with UL 198C.

- 2.10.3 Fuses, Class K, High-Interrupting-Capacity Type UL 198D.
- 2.10.4 Fuses, Class H

UL 198B.

2.10.5 Fuses, Class R

UL 198E.

2.10.6 Fuses, Class T

UL 198H.

2.10.7 Fuses for Supplementary Overcurrent Protection

UL 198G.

2.10.8 Fuses, D-C for Industrial Use

TTL 198TL

2.10.9 Fuseholders

UL 512.

2.11 INSTRUMENTS, ELECTRICAL INDICATING

ANSI C39.1.

2.12 MOTORS, AC, FRACTIONAL AND INTEGRAL

Motors, ac, fractional and integral horsepower, 500 hp and smaller shall conform to NEMA MG 1 and UL 1004for motors; NEMA MG 10 for energy management selection of polyphase motors; and UL 674 for use of motors in hazardous (classified) locations. In addition to the standards listed above, motors shall be provided with efficiencies as specified in the table "MINIMUM NOMINAL EFFICIENCIES" below.

2.12.1 Rating

The horsepower rating of motors should be limited to no more than 125 percent of the maximum load being served unless a NEMA standard size does not fall within this range. In this case, the next larger NEMA standard motor size should be used.

2.12.2 Motor Efficiencies

All permanently wired polyphase motors of 1 hp or more shall meet the minimum full-load efficiencies as indicated in the following table, and as specified in this specification. Motors of 1 hp or more with open, drip proof or totally enclosed fan cooled enclosures shall be high efficiency type, unless otherwise indicated. Motor efficiencies indicated in the tables apply to general-purpose, single-speed, polyphase induction motors. Applications which require definite purpose, special purpose, special frame, or special mounted polyphase induction motors are excluded from these efficiency requirements. Motors provided as an integral part of motor driven equipment are excluded from this requirement if a minimum seasonal or overall efficiency requirement is indicated for that equipment by the provisions of another section.

MINIMUM NOMINAL MOTOR EFFICIENCIES
OPEN DRIP PROOF MOTORS

<u>kw</u>	1200 RPM	<u> 1800 RPM</u>	3600 RPM
2 746		0.5	
0.746	82.5	85.5	80.0
1.12	86.5	86.5	85.5
1.49	87.5	86.5	86.5
2.24	89.5	89.5	86.5
3.73	89.5	89.5	89.5
5.60	91.7	91.0	89.5
7.46	91.7	91.7	90.2
11.2	92.4	93.0	91.0
14.9	92.4	93.0	92.4
18.7	93.0	93.6	93.0
22.4	93.6	93.6	93.0
29.8	94.1	94.1	93.6
37.3	94.1	94.5	93.6
44.8	95.0	95.0	94.1
56.9	95.0	95.0	94.5
74.6	95.0	95.4	94.5
93.3	95.4	95.4	95.0
112.0	95.8	95.8	95.4
149.0	95.4	95.8	95.4
187.0	95.4	96.2	95.8
224.0	95.4	95.0	95.4
261.0	94.5	95.4	95.0
298.0	94.1	95.8	95.0
336.0	94.5	95.4	95.4
373.0	94.5	94.5	94.5

TOTALLY ENCLOSED FAN-COOLED MOTORS

1200 RPM	<u>1800 RPM</u>	3600 RPM
82.5	85.5	78.5
87.5	86.5	85.5
88.5	86.5	86.5
89.5	89.5	88.5
89.5	89.5	89.5
91.7	91.7	91.0
91.7	91.7	91.7
92.4	92.4	91.7
92.4	93.0	92.4
93.0	93.6	93.0
93.6	93.6	93.0
94.1	94.1	93.6
94.1	94.5	94.1
94.5	95.0	94.1
95.0	95.4	94.5
95.4	95.4	95.0
95.4	95.4	95.4
95.8	95.8	95.4
95.8	96.2	95.8
	82.5 87.5 88.5 89.5 89.5 91.7 91.7 92.4 92.4 93.0 93.6 94.1 94.1 94.1 94.5 95.0	82.5 87.5 88.5 88.5 89.5 89.5 89.5 91.7 91.7 91.7 91.7 92.4 92.4 92.4 92.4 93.0 93.0 93.6 94.1 94.1 94.1 94.1 94.1 94.1 94.5 94.5 95.0 95.4 95.4 95.4 95.8

TOTALLY	ENCLOSED	FAN-COOLED	MOTORS

187.0	95.6	96.2	95.9
224.0	95.4	96.1	95.8
261.0	94.5	96.2	94.8
298.0	94.5	95.8	94.5
336.0	94.5	94.5	94.5
373.0	94.5	94.5	94.5

MINIMUM NOMINAL MOTOR EFFICIENCIES OPEN DRIP PROOF MOTORS

HP	1200 RPM	1800 RPM	3600 RPM
1	82.5	85.5	80.0
1.5	86.5	86.5	85.5
2	87.5	86.5	86.5
3	89.5	89.5	86.5
5	89.5	89.5	89.5
7.5	91.7	91.0	89.5
10	91.7	91.7	90.2
15	92.4	93.0	91.0
20	92.4	93.0	92.4
25	93.0	93.6	93.0
30	93.6	93.6	93.0
40	94.1	94.1	93.6
50	94.1	94.5	93.6
60	95.0	95.0	94.1
75	95.0	95.0	94.5
100	95.0	95.4	94.5
125	95.4	95.4	95.0
150	95.8	95.8	95.4
200	95.4	95.8	95.4
250	95.4	96.2	95.8
300	95.4	95.0	95.4
350	94.5	95.4	95.0
400	94.1	95.8	95.0
450	94.5	95.4	95.4
500	94.5	94.5	94.5

TOTALLY ENCLOSED FAN-COOLED MOTORS

HP	1200 RPM	1800 RPM	3600 RPM
1	82.5	85.5	78.5
1.5	87.5	86.5	85.5
2	88.5	86.5	86.5
3	89.5	89.5	88.5
5	89.5	89.5	89.5
7.5	91.7	91.7	91.0
10	91.7	91.7	91.7
15	92.4	92.4	91.7
20	92.4	93.0	92.4
25	93.0	93.6	93.0
30	93.6	93.6	93.0

	TOTALLY ENCLOSE	ED FAN-COOLED MOTO	RS
40	94.1	94.1	93.6
50	94.1	94.5	94.1
60	94.5	95.0	94.1
75	95.0	95.4	94.5
100	95.4	95.4	95.0
125	95.4	95.4	95.4
150	95.8	95.8	95.4
200	95.8	96.2	95.8
250	95.6	96.2	95.9
300	95.4	96.1	95.8
350	94.5	96.2	94.8
400	94.5	95.8	94.5
450	94.5	94.5	94.5
500	94.5	94.5	94.5

2.13 MOTOR CONTROLS AND MOTOR CONTROL CENTERS

2.13.1 General

NEMA ICS 1, NEMA ICS 2, NEMA ICS 3 and NEMA ICS 6, and UL 508 and UL 845. Panelboards supplying non-linear loads shall have neutrals sized for 200 percent of rated current.

2.13.2 Motor Starters

Combination starters shall be provided with circuit breakers.

2.13.3 Thermal-Overload Protection

Each motor of 1/8 hp or larger shall be provided with thermal-overload protection. Polyphase motors shall have overload protection in each ungrounded conductor. The overload-protection device shall be provided either integral with the motor or controller, or shall be mounted in a separate enclosure. Unless otherwise specified, the protective device shall be of the manually reset type. Single or double pole tumbler switches specifically designed for alternating-current operation only may be used as manual controllers for single-phase motors having a current rating not in excess of 80 percent of the switch rating.

2.13.4 Low-Voltage Motor Overload Relays

2.13.4.1 General

Thermal and magnetic current overload relays shall conform to NEMA ICS 2 and UL 508. Overload protection shall be provided either integral with the motor or motor controller, and shall be rated in accordance with the requirements of NFPA 70. Standard units shall be used for motor starting times up to 7 seconds. Slow units shall be used for motor starting times from 8 to 12 seconds. Quick trip units shall be used on hermetically sealed, submersible pumps, and similar motors.

2.13.4.2 Construction

Manual reset type thermal relay shall be melting alloy construction. Automatic reset type thermal relays shall be bimetallic construction. Magnetic current relays shall consist of a contact mechanism and a dash pot mounted on a common frame.

2.13.4.3 Ratings

Voltage ratings shall be not less than the applicable circuit voltage. Trip current ratings shall be established by selection of the replaceable overload device and shall not be adjustable. Where the controller is remotely-located or difficult to reach, an automatic reset, non-compensated overload relay shall be provided. Manual reset overload relays shall be provided otherwise, and at all locations where automatic starting is provided. Where the motor is located in a constant ambient temperature, and the thermal device is located in an ambient temperature that regularly varies by more than minus 18 degrees F, an ambient temperature-compensated overload relay shall be provided.

2.13.5 Automatic Control Devices

2.13.5.1 Direct Control

Automatic control devices (such as thermostats, float or pressure switches) which control the starting and stopping of motors directly shall be designed for that purpose and have an adequate horsepower rating.

2.13.5.2 Pilot-Relay Control

Where the automatic-control device does not have such a rating, a magnetic starter shall be used, with the automatic-control device actuating the pilot-control circuit.

2.13.5.3 Manual/Automatic Selection

- a. Where combination manual and automatic control is specified and the automatic-control device operates the motor directly, a double-throw, three-position tumbler or rotary switch (marked MANUAL-OFF-AUTOMATIC) shall be provided for the manual control.
- b. Where combination manual and automatic control is specified and the automatic-control device actuates the pilot control circuit of a magnetic starter, the magnetic starter shall be provided with a three-position selector switch marked MANUAL-OFF-AUTOMATIC.
- c. Connections to the selector switch shall be such that; only the normal automatic regulatory control devices will be bypassed when the switch is in the Manual position; all safety control devices, such as low-or high-pressure cutouts, high-temperature cutouts, and motor-overload protective devices, shall be connected in the motor-control circuit in both the Manual and the Automatic positions of the selector switch. Control circuit connections to any MANUAL-OFF-AUTOMATIC switch or to more than one automatic regulatory control device shall be made in accordance with wiring diagram approved by the Contracting Officer unless such diagram is

included on the drawings. All controls shall be 120 volts or less unless otherwise indicated.

2.14 PANELBOARDS

Dead-front construction, NEMA PB 1 and UL 67. Panelboards shall consist of assemblies of molded-case circuit breakers with buses and terminal lugs for the control and protection of branch circuits to motors, heating devices and other equipment operating at 480 volts ac or less. Panelboards shall be UL 67 labeled. "Loadcenter" type panels are not acceptable. Panelboards shall be designed for installation in surface-mounted or flush-mounted cabinets accessible from the front only, as shown on the drawings. Panelboards shall be fully rated for a short-circuit current of 22,000 symmetrical amperes RMS ac.

2.14.1 Enclosure

Enclosures shall meet the requirements of UL 50. All cabinets shall be fabricated from sheet steel of not less than 3.5 millimeters (No. 10 gage) if flush-mounted or mounted outdoors, and not less than 2.7 millimeters (No. 12 gage) if surface-mounted indoors, with full seam-welded box ends. Cabinets mounted outdoors or flush-mounted shall be hot-dipped galvanized after fabrication. Cabinets shall be painted in accordance with paragraph PAINTING. Outdoor cabinets shall be of NEMA 3R raintight and conduit hubs welded to the cabinet. Indoor cabinets shall be NEMA 12. Front edges of cabinets shall be form-flanged or fitted with structural shapes welded or riveted to the sheet steel, for supporting the panelboard front. All cabinets shall be so fabricated that no part of any surface on the finished cabinet shall deviate from a true plane by more than 3 millimeters (1/8 inch). Holes shall be provided in the back of indoor surface-mounted cabinets, with outside spacers and inside stiffeners, for mounting the cabinets with a 15 millimeter (1/2 inch) clear space between the back of the cabinet and the wall surface. Flush doors shall be mounted on hinges that expose only the hinge roll to view when the door is closed. Each door shall be fitted with a combined catch and lock, except that doors over 600 millimeters (24 inches) long shall be provided with a three-point latch having a knob with a T-handle, and a cylinder lock. Two keys shall be provided with each lock, and all locks shall be keyed alike. Finished-head cap screws shall be provided for mounting the panelboard fronts on the cabinets. Enclosure shall have nameplates in accordance with paragraph NAMEPLATES. Directory holders, containing a neatly typed or printed directory under a transparent cover, shall be provided on the inside of panelboard doors.

2.14.2 Buses

All panelboards shall be of the dead-front type with buses and circuit breakers mounted on a plate or base for installation as a unit in a cabinet. All buses shall be of copper and shall be tin or silver-plated throughout. Copper bars and shapes for bus conductors shall conform to the applicable requirements of ASTM B 187. The sizes of buses and the details of panelboard construction shall meet or exceed the requirements of NEMA PB 1. Suitable provisions shall be made for mounting the bus within panelboards and adjusting their positions in the cabinets. Terminal lugs

required to accommodate the conductor sizes shown on the drawing, shall be provided for all branch circuits larger than No. 10 AWG. A grounding lug suitable for 1/0 AWG wire shall be provided for each panelboard.

2.14.3 Components

Each branch circuit, and the main buses where so specified or shown on the drawings, shall be equipped with molded-case circuit breakers having overcurrent trip ratings as shown on the drawings. The circuit breakers shall be of a type designed for bolted connection to buses in a panelboard assembly, and shall meet the requirements of paragraph MOLDED CASE CIRCUIT BREAKERS. Circuit breakers of the same frame size and rating shall be interchangeable.

2.14.4 Panelboard Tests

Each panelboard shall be assembled with cabinet and front to the extent necessary to check the fit and provisions for installing all parts in the field. Each panelboard shall be given a dielectric test in accordance with NEMA PB 1. All circuit breakers shall be operated to check mechanical adjustments. All doors and locks shall be checked for door clearances and fits and the performance of lock and latches.

2.15 RECEPTACLES

2.15.1 Heavy Duty Grade

NEMA WD 1. Devices shall conform to all requirements for heavy duty receptacles.

2.15.2 Standard Grade

UL 498.

2.15.3 Ground Fault Interrupters

UL 943, Class A or B.

2.15.4 NEMA Standard Receptacle Configurations

NEMA WD 6.

a. Single and Duplex, 15-Ampere and 20-Ampere, 125 Volt

15-ampere, non-locking: NEMA type 5-15R, locking: NEMA type L5-15R, 20-ampere, non-locking: NEMA type 5-20R, locking: NEMA type L5-20R.

b. 15-Ampere, 250 Volt

Two-pole, 3-wire grounding, non-locking: NEMA type 6-15R, locking: NEMA type L6-15R. Three-pole, 4-wire grounding, non-locking: NEMA type 15-15R, locking: NEMA type L15-15R.

c. 20-Ampere, 250 Volt

Two-pole, 3-wire grounding, non-locking: NEMA type 6-20R, locking: NEMA type L6-20R. Three-pole, 4-wire grounding, non-locking: NEMA type 15-20R, locking: NEMA type L15-20R.

d. 30-Ampere, 125/250 Volt

Three-pole, 3-wire, non-locking: NEMA type 10-30R, locking: NEMA type L10-30R. Three-pole, 4-wire grounding, non-locking: NEMA type 14-30R, locking: NEMA type L14-30R.

e. 30-Ampere, 250 Volt

Two-pole, 3-wire grounding, non-locking: NEMA type 6-30R, locking: NEMA type L6-30R. Three-pole, 4-wire grounding, non-locking: NEMA type 15-30R, locking: NEMA type L15-30R.

f. 50-Ampere, 125/250 Volt

Three-pole, 3-wire: NEMA type 10-50R. Three-pole, 4-wire grounding: NEMA type 14-50R.

g. 50-Ampere, 250 Volt

Two-pole, 3-wire grounding: NEMA type 6-50R. Three-pole, 4-wire grounding: NEMA type 15-50R.

2.16 Service Entrance Equipment

UL 869A.

2.17 SPLICE, CONDUCTOR

UL 486C.

2.18 POWER-SWITCHGEAR ASSEMBLIES INCLUDING SWITCHBOARDS

Assemblies shall be metal-enclosed, freestanding general-purpose ventilated type in accordance with NEMA PB 2, UL 891, and IEEE C37.20.1 and shall be installed to provide front and rear access. The switchboards shall be dead-front switchboards conforming to NEMA PB 2 and labeled under UL 891. The switchboards shall be completely enclosed self-supporting metal structures with the required number of vertical panel sections, buses, molded-case circuit breakers, as shown on the drawings. Switchboards shall be fully rated for a short-circuit current of 22,000 symmetrical amperes RMS AC.

2.18.1 Enclosure

Each switchboard enclosure shall be NEMA type 12, built with selected smooth sheet steel panels of not less than 1.9 millimeters (No. 14 gage). Exposed panels on the front and ends shall have bent angle or channel edges with all corner seams welded and ground smooth. The front outside surfaces shall not be drilled or welded for the purpose of attaching wires or

mounting devices if such holes or fastenings will be visible from the front. The front panels shall be made in sections flanged on four sides and attached to the framework by screws and arranged for ready removal for inspection or maintenance. Ventilating openings shall be provided as required and shall preferably be of the grille type. All ventilating openings shall be provided with corrosion-resistant insect-proof screens on the inside. Switchboards shall be mounted as shown on the drawings and mounting materials shall be furnished by the Contractor as indicated. All interior and exterior steel parts shall be treated to inhibit corrosion and shall be painted as specified in Paragraph PAINTING.

2.18.2 Bus

All buses shall be of copper and shall be tin or silver-plated throughout. Copper bars and shapes for bus conductors shall conform to the applicable requirements of ASTM B 187. All splices for field assembly shall be bolted with at least two bolts and shall employ the use of "Belleville" washers in the connection. Horizontal and vertical power buses have minimum current ratings as shown on the drawings. The buses shall be insulated for not less than 600 volts. Shop splices and tap connections shall be brazed, pressure-welded or bolted. All splices for field assembly shall be bolted. The buses shall be mounted on insulating supports of wet process porcelain, glass polyester, or suitable molded material, and shall be braced to withstand not less than 22,000 symmetrical amperes ac.

2.18.3 Grounding Bus

A copper ground bus, rated not less than 300 amps, extending the entire length of the assembled structure, shall be mounted near the bottom of enclosure. A full clamp-type solderless copper or copper alloy lug for No. 2/0 AWG stranded copper cable shall be provided at each end of the bus for connection to the station grounding system.

2.18.4 Components

Each switchboard shall be equipped with molded-case circuit breakers conforming to paragraph MOLDED CASE CIRCUIT BREAKERS and with frame sizes, trip ratings, and terminal connectors for attachment of outgoing power cables as shown on the drawings. The circuit breakers shall be individually stationary mounted, as shown on the drawings, and shall be operable and removable from the front. Where shown on the drawings, circuit breakers shall be enclosed in individual compartments. The group-mounted circuit breakers shall be provided complete with bus work in an integrated assembly on the switchboard and shall conform to the applicable requirements of paragraph PANELBOARDS.

2.18.5 Production Tests

Each switchboard shall be completely assembled and given applicable production tests for assembled switchgear as specified in NEMA PB 2.

2.18.6 Short Circuit Tests

If the unit is not UL labeled for the specified short circuit, the

contractor may submit design tests demonstrating that satisfactory short-circuit tests have been made on a switchboard of similar type of construction and of the same short-circuit rating as the switchboards specified to be furnished under these specifications.

2.19 CIRCUIT BREAKERS

Circuit breakers shall be molded-case circuit breakers.

2.20 AUXILIARY EQUIPMENT

2.20.1 Control Switch

A control switch with indicating lights shall be provided for each electrically operated breaker.

2.20.2 Control Power Sources

Control buses and control power transformers shall conform to the requirements of Section 16403: MOTOR CONTROL CENTERS, SWITCHBOARDS AND PANELBOARDS, where required. Control power shall be 120-volt AC.

2.20.3 Snap Switches

UL 20.

2.21 TAPES

2.21.1 Plastic Tape

UL 510.

2.21.2 Rubber Tape

UL 510.

2.22 TRANSFORMERS

Single- and three-phase transformers shall have two windings per phase. Full-capacity standard NEMA taps shall be provided in the primary windings of transformers unless otherwise indicated. Three-phase transformers shall be configured with delta-wye windings, except as indicated. "T" connections may be used for transformers rated 15 kVA or below. Transformers supplying non-linear loads shall be UL listed as suitable for supplying such loads with a total K-factor not to exceed K-9 and have neutrals sized for 200 percent of rated current.

2.22.1 Transformers, Dry-Type

Transformers shall have 220 degrees C insulation system for transformers 15 kVA and greater, and shall have 180 degrees C insulation system for transformers rated 10 kVA and less, with temperature rise not exceeding 115 degrees C under full-rated load in maximum ambient temperature of 40

degrees C. Transformer of 115 degrees C temperature rise shall be capable of carrying continuously 115 percent of nameplate kVA without exceeding insulation rating.

a. 600 Volt or Less Primary:

NEMA ST 20, UL 506, general purpose, dry-type, self-cooled, unventilated. Transformers shall be provided in NEMA 1 enclosure. Transformers shall be quiet type with maximum sound level at least 3 decibels less than NEMA standard level for transformer ratings indicated.

2.22.2 Average Sound Level

The average sound level in decibels (dB) of transformers shall not exceed the following dB level at 12 inches for the applicable kVA rating range listed unless otherwise indicated:

kVA Range	dВ	Sound	Level
1 50			F.0
1-50			50
51-150			55
151-300			58
301-500			60
501-700			62
701-1000			64
1001-1500			65
1501 & above			70

2.23 ISOLATED POWER SYSTEM EQUIPMENT

UL 1047, with monitor UL 1022.

2.24 WATTHOUR METERS, UTILITY REVENUE

The Water & Light Department will furnish 9S, 3 Stator. The Contractor shall provide the appropriate socket for this meter.

2.25 INSTRUMENT TRANSFORMERS

2.25.1 General

Instrument transformers shall be furnished and installed by the W&L Department.

2.26 WIRING DEVICES

NEMA WD 1 for wiring devices, and NEMA WD 6 for dimensional requirements of wiring devices.

2.27 LIQUID-DIELECTRICS

Liquid dielectrics for transformers, capacitors, and other liquid-filled

electrical equipment shall be non-polychlorinated biphenyl (PCB) mineral oil or less flammable liquid as specified. Nonflammable fluids shall not be used. Tetrachloroethylene (perchloroethylene) and 1, 2, 4 trichlorobenzene fluids shall be certified by the manufacturer as having less than 2 parts per million (ppm) PCB content. In lieu of the manufacturer's certification, the Contractor may submit a test sample of the dielectric in accordance with ASTM D 4059 at a testing facility approved by the Contracting Officer. Equipment with test results indicating PCB level exceeding 2 ppm shall be replaced.

2.28 PAINTING

Interior and exterior steel surfaces of equipment enclosures shall be thoroughly cleaned and then receive a rust-inhibitive phosphatizing or equivalent treatment prior to painting. Exterior surfaces shall be free from holes, seams, dents, weld marks, loose scale or other imperfections. Interior surfaces shall receive not less than one coat of corrosion-resisting paint in accordance with the manufacturer's standard practice. Exterior surfaces shall be primed, filled where necessary, and given not less than two coats baked enamel with semigloss finish. Equipment located indoors shall be ANSI Light Gray, and equipment located outdoors shall be ANSI Dark Gray. All touch-up work shall be done with manufacturer's coatings as supplied under paragraph SPARE PARTS.

PART 3 EXECUTION

3.1 GROUNDING

Grounding shall be in conformance with NFPA 70, the contract drawings, and the following specifications.

3.1.1 Ground Rods

The resistance to ground shall be measured using the fall-of-potential method described in IEEE Std 81. The maximum resistance of a driven ground shall not exceed 25 ohms under normally dry conditions. If this resistance cannot be obtained with a single rod, additional rods not less than 6 feet on centers, or if sectional type rods are used, additional sections may be coupled and driven with the first rod. In high-ground-resistance, UL listed chemically charged ground rods may be used. If the resultant resistance exceeds 25 ohms measured not less than 48 hours after rainfall, the Contracting Officer shall be notified immediately. Connections below grade shall be fusion welded. Connections above grade shall be fusion welded or shall use UL 467 approved connectors.

3.1.2 Ground Bus

Ground bus shall be provided in the electrical equipment rooms as indicated. Noncurrent-carrying metal parts of electrical equipment shall be effectively grounded by bonding to the ground bus. The ground bus shall be bonded to both the entrance ground, and to a ground rod or rods as specified above having the upper ends terminating approximately 4 inches above the floor. Connections and splices shall be of the brazed, welded, bolted, or pressure-connector type, except that pressure connectors or

bolted connections shall be used for connections to removable equipment. For raised floor equipment rooms in computer and data processing centers, a minimum of 4, one at each corner, multiple grounding systems shall be furnished. Connections shall be bolted type in lieu of thermoweld, so they can be changed as required by additions and/or alterations.

3.1.3 Grounding Conductors

All equipment grounding conductors, including metallic raceway systems used as such, shall be bonded or joined together in each wiring box or equipment enclosure. Metallic raceways and grounding conductors shall be checked to assure that they are wired or bonded into a common junction. Metallic boxes and enclosures, if used, shall also be bonded to these grounding conductors by an approved means per NFPA 70. When switches, or other utilization devices are installed, any designated grounding terminal on these devices shall also be bonded to the equipment grounding conductor junction with a short jumper.

3.2 WIRING METHODS

Wiring shall conform to NFPA 70, the contract drawings, and the following specifications. Unless otherwise indicated, wiring shall consist of insulated conductors installed in rigid zinc-coated steel conduit. Where cables and wires are installed in cable trays, they shall be of the type permitted by NFPA 70 for use in such applications. Wire fill in conduits shall be based on NFPA 70 for the type of conduit and wire insulations specified. Wire fill in conduits located in Class I or II hazardous areas shall be limited to 25 percent of the cross sectional area of the conduit.

3.2.1 Conduit and Tubing Systems

Conduit and tubing systems shall be installed as indicated. Conduit sizes shown are based on use of copper conductors with insulation types as described in paragraph WIRING METHODS. Minimum size of raceways shall be 1/2 inch. Only metal conduits will be permitted when conduits are required for shielding or other special purposes indicated, or when required by conformance to NFPA 70. Nonmetallic conduit and tubing may be used in damp, wet or corrosive locations when permitted by NFPA 70 and the conduit or tubing system is provided with appropriate boxes, covers, clamps, screws or other appropriate type of fittings. Electrical metallic tubing (EMT) may be installed only within buildings. EMT may be installed in concrete and grout in dry locations. EMT installed in concrete or grout shall be provided with concrete tight fittings. EMT shall not be installed in damp or wet locations, or the air space of exterior masonry cavity walls. Bushings, manufactured fittings or boxes providing equivalent means of protection shall be installed on the ends of all conduits and shall be of the insulating type, where required by NFPA 70. Only UL listed adapters shall be used to connect EMT to rigid metal conduit, cast boxes, and conduit bodies. Except as otherwise specified, IMC may be used as an option for rigid steel conduit in areas as permitted by NFPA 70. Raceways shall not be installed under the firepits of boilers and furnaces and shall be kept 6 inches away from parallel runs of flues, steam pipes and hot-water pipes. Raceways shall be concealed within finished walls, ceilings, and floors unless otherwise shown. Raceways crossing structural

expansion joints or seismic joints shall be provided with suitable expansion fittings or other suitable means to compensate for the building expansion and contraction and to provide for continuity of grounding. Wiring installed in underfloor raceway system shall be suitable for installation in wet locations.

3.2.1.1 Pumping Facilities

All power and control wiring shall be installed in GRC or IMC conduit in pumping facilities. EMT shall be permitted for telephone and communications.

3.2.2 Pull Wires

A pull wire shall be inserted in each empty raceway in which wiring is to be installed if the raceway is more than 50 feet in length and contains more than the equivalent of two 90-degree bends, or where the raceway is more than 150 feet in length. The pull wire shall be of No. 14 AWG zinc-coated steel, or of plastic having not less than 200 pounds per square inch tensile strength. Not less than 10 inches of slack shall be left at each end of the pull wire.

3.2.3 Conduit Stub-Ups

Where conduits are to be stubbed up through concrete floors, a short elbow shall be installed below grade to transition from the horizontal run of conduit to a vertical run. A conduit coupling fitting, threaded on the inside shall be installed, to allow terminating the conduit flush with the finished floor. Wiring shall be extended in rigid threaded conduit to equipment, except that where required, flexible conduit may be used 6 inches above the floor. Empty or spare conduit stub-ups shall be plugged flush with the finished floor with a threaded, recessed plug.

3.2.4 Below Slab-on-Grade or in the Ground

Electrical wiring below slab-on-grade shall be protected by a conduit system. Conduit passing vertically through slabs-on-grade shall be rigid steel or IMC. Rigid steel or IMC conduits installed below slab-on-grade or in the earth shall be field wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system.

3.2.5 Installing in Slabs Including Slabs on Grade

Conduit installed in slabs-on-grade shall be rigid steel or IMC. Conduits shall be installed as close to the middle of concrete slabs as practicable without disturbing the reinforcement. Outside diameter shall not exceed 1/3 of the slab thickness and conduits shall be spaced not closer than 3 diameters on centers except at cabinet locations where the slab thickness shall be increased as approved by the Contracting Officer. Where conduit is run parallel to reinforcing steel, the conduit shall be spaced a minimum of one conduit diameter away but not less than one inch from the reinforcing steel.

3.2.6 Changes in Direction of Runs

Changes in direction of runs shall be made with symmetrical bends or cast-metal fittings. Field-made bends and offsets shall be made with an approved hickey or conduit-bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Lodgment of plaster, dirt, or trash in raceways, boxes, fittings and equipment shall be prevented during the course of construction. Clogged raceways shall be cleared of obstructions or shall be replaced.

3.2.7 Supports

Metallic conduits and tubing, and the support system to which they are attached, shall be securely and rigidly fastened in place to prevent vertical and horizontal movement at intervals of not more than 10 feet and within 3 feet of boxes, cabinets, and fittings, with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps, beam clamps, or ceiling trapeze. Loads and supports shall be coordinated with supporting structure to prevent damage or deformation to the structure. Loads shall not be applied to joist bridging. Attachment shall be by wood screws or screw-type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws, welded threaded studs, heat-treated or spring-steel-tension clamps on steel work. Nail-type nylon anchors or threaded studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine screws. Raceways or pipe straps shall not be welded to steel structures. Cutting the main reinforcing bars in reinforced concrete beams or joists shall be avoided when drilling holes for support anchors. Holes drilled for support anchors, but not used, shall be filled. In partitions of light steel construction, sheet-metal screws may be used. Raceways shall not be supported using wire or nylon ties. Raceways shall be independently supported from the structure. Upper raceways shall not be used as a means of support for lower raceways. Supporting means shall not be shared between electrical raceways and mechanical piping or ducts. Cables and raceways shall not be supported by ceiling grids. Except where permitted by NFPA 70, wiring shall not be supported by ceiling support systems. Conduits shall be fastened to sheet-metal boxes and cabinets with two locknuts where required by NFPA 70, where insulating bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, a single locknut and bushing may be used. Threadless fittings for electrical metallic tubing shall be of a type approved for the conditions encountered. Additional support for horizontal runs is not required when EMT rests on steel stud cutouts.

3.2.8 Exposed Raceways

Exposed raceways shall be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings. Raceways under raised floors and above accessible ceilings shall be considered as exposed installations in accordance with NFPA 70 definitions.

3.2.9 Exposed Risers

Exposed risers in wire shafts of multistory buildings shall be supported by U-clamp hangers at each floor level, and at intervals not to exceed 10 feet.

3.3 CABLES AND CONDUCTORS

Installation shall conform to the requirements of NFPA 70. Covered, bare or insulated conductors of circuits rated over 600 volts shall not occupy the same equipment wiring enclosure, cable, or raceway with conductors of circuits rated 600 volts or less.

3.3.1 Sizing

Unless otherwise noted, all sizes are based on copper conductors and the insulation types indicated. Sizes shall be not less than indicated. Branch-circuit conductors shall be not smaller than No. 12 AWG. Conductors for branch circuits of 120 volts more than 100 feet long and of 277 volts more than 230 feet long, from panel to load center, shall be no smaller than No. 10 AWG. Class 1 remote control and signal circuit conductors shall be not less than No. 14 AWG. Class 2 remote control and signal circuit conductors shall be not less than No. 16 AWG. Class 3 low-energy, remote-control and signal circuits shall be not less than No. 22 AWG.

3.3.2 Use of Aluminum Conductors in Lieu of Copper

Aluminum conductors shall not be used.

3.3.3 Cable Systems

Cable systems shall be installed where indicated. Cables shall be installed concealed behind ceiling or wall finish where practicable. Cables shall be threaded through holes bored on the approximate centerline of wood members; notching of surfaces will not be permitted. Sleeves shall be provided through bond beams of masonry-block walls for threading cables through hollow spaces. Exposed cables shall be installed parallel or at right angles to walls or structural members. In rooms or areas not provided with ceiling or wall finish, cables and outlets shall be installed so that a room finish may be applied in the future without disturbing the cables or resetting the boxes. Exposed nonmetallic-sheathed cables less than 4 feet above floors shall be protected from mechanical injury by installation in conduit or tubing.

3.3.3.1 Cable Splicing

Splices shall be made in an accessible location. Crimping tools and dies shall be approved by the connector manufacturer for use with the type of connector and conductor.

a. Copper Conductors, 600 Volt and Under: Splices in conductors No. 10 AWG and smaller diameter shall be made with an insulated, pressure-type connector. Splices in conductors No. 8 AWG and larger diameter shall be made with a solderless connector and insulated with tape or heat-shrink type insulating material

equivalent to the conductor insulation.

3.3.4 Conductor Identification and Tagging

Power, control, and signal circuit conductor identification shall be provided within each enclosure where a tap, splice, or termination is made. Where several feeders pass through a common pull box, the feeders shall be tagged to indicate clearly the electrical characteristics, circuit number, and panel designation. Phase conductors of low voltage power circuits shall be identified by color coding. Phase identification by a particular color shall be maintained continuously for the length of a circuit, including junctions.

a. Color coding shall be provided for service, feeder, branch, and ground conductors. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in the same raceway or box, other neutral shall be white with colored (not green) stripe. The color coding for 3-phase and single-phase low voltage systems shall be as follows:

120/208-volt, 3-phase: Black(A), red(B), and blue(C). 277/480-volt, 3-phase: Brown(A), orange(B), and yellow(C). 120/240-volt, 1-phase: Black and red.

- b. Conductor phase and voltage identification shall be made by color-coded insulation for all conductors smaller than No. 6 AWG. For conductors No. 6 AWG and larger, identification shall be made by color-coded insulation, or conductors with black insulation may be furnished and identified by the use of half-lapped bands of colored electrical tape wrapped around the insulation for a minimum of 3 inches of length near the end, or other method as submitted by the Contractor and approved by the Contracting Officer.
- c. Control and signal circuit conductor identification shall be made by color-coded insulated conductors, plastic-coated self-sticking printed markers, permanently attached stamped metal foil markers, or equivalent means as approved. Control circuit terminals of equipment shall be properly identified. Terminal and conductor identification shall match that shown on approved detail drawings. Hand lettering or marking is not acceptable.

3.4 BOXES AND SUPPORTS

Boxes shall be provided in the wiring or raceway systems where required by NFPA 70 for pulling of wires, making connections, and mounting of devices or fixtures. Pull boxes shall be furnished with screw-fastened covers. Indicated elevations are approximate, except where minimum mounting heights for hazardous areas are required by NFPA 70. Unless otherwise indicated, boxes for wall switches shall be mounted 48 inches above finished floors. Switch and outlet boxes located on opposite sides of fire rated walls shall be separated by a minimum horizontal distance of 24 inches. The total combined area of all box openings in fire rated walls shall not exceed 100

square inches per 100 square feet. Maximum box areas for individual boxes in fire rated walls vary with the manufacturer and shall not exceed the maximum specified for that box in UL Elect Const Dir. Only boxes listed in UL Elect Const Dir shall be used in fire rated walls.

3.4.1 Box Applications

Each box shall have not less than the volume required by NFPA 70 for number of conductors enclosed in box. Boxes for metallic raceways shall be listed for the intended use when located in normally wet locations, when flush or surface mounted on outside of exterior surfaces, or when located in hazardous areas. Boxes installed in wet locations and boxes installed flush with the outside of exterior surfaces shall be gasketed. Boxes for mounting lighting fixtures shall be not less than 4 inches square, or octagonal, except smaller boxes may be installed as required by fixture configuration, as approved. Cast-metal boxes with 3/32 inch wall thickness are acceptable. Large size boxes shall be NEMA 12 or as shown. Boxes in other locations shall be sheet steel except that aluminum boxes may be used with aluminum conduit, and nonmetallic boxes may be used with nonmetallic conduit and tubing or nonmetallic sheathed cable system, when permitted by NFPA 70. Boxes for use in masonry-block or tile walls shall be square-cornered, tile-type, or standard boxes having square-cornered, tile-type covers.

3.4.2 Brackets and Fasteners

Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength, with bolts and metal expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screw or welded studs on steel work. Threaded studs driven in by powder charge and provided with lockwashers and nuts, or nail-type nylon anchors may be used in lieu of expansion shields, or machine screws. Penetration of more than 1-1/2 inches into reinforced-concrete beams or more than 3/4 inch into reinforced-concrete joists shall avoid cutting any main reinforcing steel. The use of brackets which depend on gypsum wallboard or plasterboard for primary support will not be permitted. In partitions of light steel construction, bar hangers with 1 inch long studs, mounted between metal wall studs or metal box mounting brackets shall be used to secure boxes to the building structure. When metal box mounting brackets are used, additional box support shall be provided on the side of the box opposite the brackets. This additional box support shall consist of a minimum 12 inch long section of wall stud, bracketed to the opposite side of the box and secured by two screws through the wallboard on each side of the stud. Metal screws may be used in lieu of the metal box mounting brackets.

3.4.3 Mounting in Walls, Ceilings, or Recessed Locations

In walls or ceilings of concrete, tile, or other non-combustible material, boxes shall be installed so that the edge of the box is not recessed more than 1/4 inch from the finished surface. Boxes mounted in combustible walls or ceiling material shall be mounted flush with the finished surface. The use of gypsum or plasterboard as a means of supporting boxes will not be permitted. Boxes installed for concealed wiring shall be provided with

suitable extension rings or plaster covers, as required. The bottom of boxes installed in masonry-block walls for concealed wiring shall be mounted flush with the top of a block to minimize cutting of the blocks, and boxes shall be located horizontally to avoid cutting webs of block. Separate boxes shall be provided for flush or recessed fixtures when required by the fixture terminal operating temperature, and fixtures shall be readily removable for access to the boxes unless ceiling access panels are provided.

3.4.4 Installation in Overhead Spaces

In open overhead spaces, cast-metal boxes threaded to raceways need not be separately supported except where used for fixture support; cast-metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers. Hangers shall not be fastened to or supported from joist bridging. Where bar hangers are used, the bar shall be attached to raceways on opposite sides of the box and the raceway shall be supported with an approved type fastener not more than 24 inches from the box.

3.5 DEVICE PLATES

One-piece type device plates shall be provided for all outlets and fittings. Plates on unfinished walls and on fittings shall be of zinc-coated sheet steel, cast-metal, or impact resistant plastic having rounded or beveled edges. Plates on finished walls shall be of satin finish corrosion resistant steel or satin finish chromium plated brass. Screws shall be of metal with countersunk heads, in a color to match the finish of the plate. Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed with an alignment tolerance of 1/16 inch. The use of sectional-type device plates will not be permitted. Plates installed in wet locations shall be gasketed and provided with a hinged, gasketed cover, unless otherwise specified.

3.6 RECEPTACLES

3.6.1 Single and Duplex, 15 or 20-ampere, 125 volt

Single and duplex receptacles shall be rated 20 amperes, 125 volts, two-pole, three-wire, grounding type with polarized parallel slots. Bodies shall be of ivory to match color of switch handles in the same room or to harmonize with the color of the respective wall, and supported by mounting strap having plaster ears. Contact arrangement shall be such that contact is made on two sides of an inserted blade. Receptacle shall be side- or back-wired with two screws per terminal. The third grounding pole shall be connected to the metal mounting yoke. Switched receptacles shall be the same as other receptacles specified except that the ungrounded pole of each suitable receptacle shall be provided with a separate terminal. Only the top receptacle of a duplex receptacle shall be wired for switching application. Receptacles with ground fault circuit interrupters shall have the current rating as indicated, and shall be UL Class A type unless otherwise shown. Ground fault circuit protection shall be provided as

required by NFPA 70 and as indicated on the drawings.

3.6.2 Weatherproof Applications

Weatherproof receptacles shall be suitable for the environment, damp or wet as applicable, and the housings shall be labeled to identify the allowable use. Receptacles shall be marked in accordance with UL 514A for the type of use indicated; "Damp locations", "Wet Locations", "Wet Location Only When Cover Closed". Assemblies shall be installed in accordance with the manufacturer's recommendations.

3.6.3 Damp Locations

Receptacles in damp locations shall be mounted in an outlet box with a gasketed, weatherproof, cast-metal cover plate (device plate, box cover) and a gasketed cap (hood, receptacle cover) over each receptacle opening. The cap shall be either a screw-on type permanently attached to the cover plate by a short length of bead chain or shall be a flap type attached to the cover with a spring loaded hinge.

3.6.4 Wet Locations

Receptacles in wet locations shall be installed in an assembly rated for such use whether the plug is inserted or withdrawn, unless otherwise indicated. In a duplex installation, the receptacle cover shall be configured to shield the connections whether one or both receptacles are in use.

3.6.5 Receptacles, 30-Ampere, 125/250-Volt

Receptacles, single, 30-ampere, 125/250-volt, shall be molded-plastic, three-pole, four-wire, grounding type, complete with appropriate mating cord-grip type attachment plug.

3.6.6 Receptacles, 30-Ampere, 250-Volt

Receptacles, single, 30-ampere, 250-volt, shall be molded-plastic, three-pole, three-wire type, complete with appropriate mating cord-grip plug.

3.6.7 Receptacles, 50-Ampere, 250-Volt

Receptacles, single, 50-ampere, 250-volt, shall be flush molded plastic, three-pole, three-wire type, complete with appropriate mating cord-grip plug.

3.6.8 Special-Purpose or Heavy-Duty Receptacles

Special-purpose or heavy-duty receptacles shall be of the type and of ratings and number of poles indicated or required for the anticipated purpose. Contact surfaces may be either round or rectangular. One appropriate straight or angle-type plug shall be furnished with each receptacle. Locking type receptacles, rated 30 amperes or less, shall be locked by rotating the plug. Locking type receptacles, rated more than 50

amperes, shall utilize a locking ring.

3.7 WALL SWITCHES

Wall switches shall be of the totally enclosed tumbler type. The wall switch handle and switch plate color shall be ivory. Wiring terminals shall be of the screw type or of the solderless pressure type having suitable conductor-release arrangement. Not more than one switch shall be installed in a single-gang position. Switches shall be rated 20-ampere 120-volt for use on alternating current only. Pilot lights indicated shall consist of yoke-mounted candelabra-base sockets rated at 75 watts, 125 volts, and fitted with glass or plastic jewels. A clear 6-watt lamp shall be furnished and installed in each pilot switch. Jewels for use with switches controlling motors shall be green, and jewels for other purposes shall be red. Dimming switches shall be solid-state flush mounted, sized for the loads.

3.8 SERVICE EQUIPMENT

Service-disconnecting means shall be of the type indicated with an external handle for manual operation. When service disconnecting means is a part of an assembly, the assembly shall be listed as suitable for service entrance equipment. Enclosures shall be sheet metal with hinged cover for surface mounting unless otherwise indicated.

3.9 PANELBOARDS AND LOADCENTERS

Circuit breakers and switches used as a motor disconnecting means shall be capable of being locked in the open position. Door locks shall be keyed alike. Nameplates shall be as approved. Directories shall be typed to indicate loads served by each circuit and mounted in a holder behind a clear protective covering. Busses shall be copper.

3.9.1 Loadcenters

Loadcenters shall be circuit breaker equipped.

3.9.2 Panelboards

Panelboards shall be circuit breaker or fusible switch equipped as indicated on the drawings.

3.10 FUSES

Equipment provided under this contract shall be provided with a complete set of properly rated fuses when the equipment manufacturer utilize fuses in the manufacture of the equipment, or if current-limiting fuses are required to be installed to limit the ampere-interrupting capacity of circuit breakers or equipment to less than the maximum available fault current at the location of the equipment to be installed. Fuses shall have a voltage rating of not less than the phase-to-phase circuit voltage, and shall have the time-current characteristics required for effective power system coordination. Time-delay and non-time-delay options shall be as specified.

3.10.1 Cartridge Fuses; Noncurrent-Limiting Type

Cartridge fuses of the noncurrent-limiting type shall be Class H, nonrenewable, dual element, time lag type and shall have interrupting capacity of 10,000 amperes. At 500 percent current, cartridge fuses shall not blow in less than 10 seconds.

3.10.2 Cartridge Fuses; Current-Limiting Type

Cartridge fuses, current-limiting type J shall have tested interrupting capacity not less than 100,000 amperes. Fuse holders shall be the type that will reject all Class H fuses.

3.10.3 Continuous Current Ratings (600 Amperes and Smaller)

Service entrance and feeder circuit fuses (600 amperes and smaller) shall be Class RK1, current-limiting, time-delay with 200,000 amperes interrupting capacity.

3.10.4 Motor and Transformer Circuit Fuses

Motor, motor controller, transformer, and inductive circuit fuses shall be Class RK1 or RK5, current-limiting, time-delay with 200,000 amperes interrupting capacity.

3.11 UNDERGROUND SERVICE

Unless otherwise indicated, interior conduit systems shall be stubbed out 5 feet beyond the building wall and 2 feet below finished grade, for interface with the exterior service lateral conduits and exterior communications conduits. Outside conduit ends shall be bushed when used for direct burial service lateral conductors. Outside conduit ends shall be capped or plugged until connected to exterior conduit systems. Underground service lateral conductors will be extended to building service entrance and terminated in accordance with the requirements of Section 16140 ELECTRICAL SERVICE and NFPA 70.

3.12 AERIAL SERVICE

Services shall conform to the requirements of Section 16140 ELECTRICAL SERVICE, IEEE C2, and NFPA 70. The service drop conductors shall be continuous from the point of connection on the last pole to the service mast or structural support, connected to the service entrance conductors, and shall be routed to a weatherhead, or weatherproof conduit fitting, before entry into an enclosing conduit. A drip loop shall be formed in each service conductor below the entrance to the weatherhead or the weatherproof conduit fitting. The weatherhead or weatherproof service entrance conduit fitting shall be securely fastened to a rigid galvanized steel (RGS) conduit that shall be terminated in the meter enclosure which penetrates the exterior wall. Penetration of the conduit through an exterior wall shall be sealed to prevent the entrance of moisture and the escape of conditioned air. Service entrance conductors shall be routed in RGS in the exterior wall, or in the interior of the building or facility

that contains the meter enclosure. Aerial service drop conductors will be extended to building service entrance and terminated.

3.13 MOTORS

Each motor shall conform to the hp and voltage ratings indicated, and shall have a service factor and other characteristics that are essential to the proper application and performance of the motors under conditions shown or specified. Three-phase motors for use on 3-phase 208-volt systems shall have a nameplate rating of 200 volts. Unless otherwise specified, all motors shall have open frames, and continuous-duty classification based on a 40 degree C ambient temperature reference. Polyphase motors shall be squirrel-cage type, having normal-starting-torque and low-starting-current characteristics, unless other characteristics are specified in other sections of these specifications or shown on contract drawings. The Contractor shall be responsible for selecting the actual horsepower ratings and other motor requirements necessary for the applications indicated. When electrically driven equipment furnished under other sections of these specifications materially differs from the design, the Contractor shall make the necessary adjustments to the wiring, disconnect devices and branch-circuit protection to accommodate the equipment actually installed.

3.14 MOTOR CONTROL

Each motor or group of motors requiring a single control and not controlled from a motor-control center shall be provided under other sections of these specifications with a suitable controller and devices that will perform the functions as specified for the respective motors. Each motor of 1/8 hp or larger shall be provided with thermal-overload protection. Polyphase motors shall have overload protection in each ungrounded conductor. The overload-protection device shall be provided either integral with the motor or controller, or shall be mounted in a separate enclosure. Unless otherwise specified, the protective device shall be of the manually reset type. Single or double pole tumbler switches specifically designed for alternating-current operation only may be used as manual controllers for single-phase motors having a current rating not in excess of 80 percent of the switch rating. Automatic control devices such as thermostats, float or pressure switches may control the starting and stopping of motors directly, provided the devices used are designed for that purpose and have an adequate horsepower rating. When the automatic-control device does not have such a rating, a magnetic starter shall be used, with the automatic-control device actuating the pilot-control circuit. When combination manual and automatic control is specified and the automatic-control device operates the motor directly, a double-throw, three-position tumbler or rotary switch shall be provided for the manual control; when the automatic-control device actuates the pilot control circuit of a magnetic starter, the latter shall be provided with a three-position selector switch marked MANUAL-OFF-AUTOMATIC. Connections to the selector switch shall be such that only the normal automatic regulatory control devices will be bypassed when the switch is in the Manual position; all safety control devices, such as low- or high-pressure cutouts, high-temperature cutouts, and motor-overload protective devices, shall be connected in the motor-control circuit in both the Manual and the Automatic positions of the selector switch. Control circuit connections to any

MANUAL-OFF-AUTOMATIC switch or to more than one automatic regulatory control device shall be made in accordance with wiring diagram approved by the Contracting Officer unless such diagram is included on the drawings. All controls shall be 120 volts or less unless otherwise indicated.

3.14.1 Contacts

Unless otherwise indicated, contacts in miscellaneous control devices such as float switches, pressure switches, and auxiliary relays shall have current and voltage ratings in accordance with NEMA ICS 2 for rating designation B300.

3.14.2 Safety Controls

Safety controls for boilers shall be connected to a 2-wire, 120 volt grounded circuit supplied from the associated boiler-equipment circuit. Where the boiler circuit is more than 120 volts to ground, safety controls shall be energized through a two-winding transformer having its 120 volt secondary winding grounded. Overcurrent protection shall be provided in the ungrounded secondary conductor and shall be sized for the load encountered.

3.15 MOTOR-DISCONNECT MEANS

Each motor shall be provided with a disconnecting means when required by NFPA 70 even though not indicated. For single-phase motors, a single or double pole toggle switch, rated only for alternating current, will be acceptable for capacities less than 30 amperes, provided the ampere rating of the switch is at least 125 percent of the motor rating. Switches shall disconnect all ungrounded conductors.

3.16 TRANSFORMER INSTALLATION

Three-phase transformers shall be connected only in a delta-wye or wye-delta configuration as indicated. "T" connections may be used for transformers rated at 15 kVA or below. Dry-type transformers shown located within 5 feet of the exterior wall shall be provided in a weatherproof enclosure. Transformers to be located within the building may be provided in the manufacturer's standard, ventilated indoor enclosure designed for use in 40 degrees C ambient temperature, unless otherwise indicated.

3.17 LIGHTING FIXTURES, LAMPS AND BALLASTS

This paragraph shall cover the installation of lamps, lighting fixtures and ballasts in interior or building mounted applications.

3.17.1 Lamps

Lamps of the type, wattage, and voltage rating indicated shall be delivered to the project in the original cartons and installed just prior to project completion. Lamps installed and used for working light during construction shall be replaced prior to turnover to the Government if more than 15% of their rated life has been used. Lamps shall be tested for proper operation prior to turn-over and shall be replaced if necessary with new lamps from

the original manufacturer. 10% spare lamps of each type, from the original manufacturer, shall be provided.

3.17.2 Lighting Fixtures

Fixtures shall be as shown and shall conform to the following specifications and shall be as detailed on the drawings. Illustrations shown on the drawings are indicative of the general type desired and are not intended to restrict selection to fixtures of any particular manufacturer. Fixtures of similar designs and equivalent energy efficiency, light distribution and brightness characteristics, and of equal finish and quality will be acceptable if approved. In suspended acoustical ceilings with fluorescent fixtures, the fluorescent emergency light fixtures shall be furnished with self-contained battery packs.

3.17.2.1 Accessories

Accessories such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

3.17.2.2 Ceiling Fixtures

Ceiling fixtures shall be coordinated with and suitable for installation in, on or from the ceiling as shown. Installation and support of fixtures shall be in accordance with NFPA 70 and manufacturer's recommendations. Where seismic requirements are specified herein, fixtures shall be supported as shown or specified. Recessed fixtures shall have adjustable fittings to permit alignment with ceiling panels. Recessed fixtures installed in fire-resistive ceiling construction shall have the same fire rating as the ceiling or shall be provided with fireproofing boxes having materials of the same fire rating as the ceiling, in conformance withUL Elect Const Dir. Surface-mounted fixtures shall be suitable for fastening to the ceiling panel structural supports.

3.17.2.3 Fixtures for Installation in Grid Type Ceilings

Fixtures for installation in grid type ceilings which are smaller than a full tile shall be centered in the tile. 1 by 4 foot fixtures shall be mounted along the grid rail as shown. Work above the ceiling shall be coordinated among the trades to provide the lighting layout shown. Fixtures mounted to the grid shall have trim exactly compatible with the grid. Contractor shall coordinate trims with ceiling trades prior to ordering fixtures. Metric fixtures shall be designed to fit the metric grid specified. Fixtures in continuous rows shall be coordinated between trades prior to ordering. Fixtures shall be mounted using independent supports capable of supporting the entire weight of the fixture. No fixture shall rest solely on the ceiling grid. Recessed fixtures installed in seismic areas should be installed utilizing specially designed seismic clips. Junction boxes shall be supported at four points.

3.17.2.4 Suspended Fixtures

Suspended fixtures shall be provided with swivel hangers or hand-straights so that they hang plumb. Pendants, rods, or chains 4 feet or longer

excluding fixture shall be braced to prevent swaying using three cables at 120 degrees of separation. Suspended fixtures in continuous rows shall have internal wireway systems for end to end wiring and shall be properly aligned to provide a straight and continuous row without bends, gaps, light leaks or filler pieces. Aligning splines shall be used on extruded aluminum fixtures to assure hairline joints. Steel fixtures shall be supported to prevent "oil-canning" effects. Fixture finishes shall be free of scratches, nicks, dents, and warps, and shall match the color and gloss specified. Pendants shall be finished to match fixtures. Aircraft cable shall be stainless steel. Canopies shall be finished to match the ceiling and shall be low profile unless otherwise shown. Maximum distance between suspension points shall be 10 feet or as recommended by the manufacturer, whichever is less.

Suspended fixtures installed in seismic areas shall have 45% swivel hangers and shall be located with no obstructions within the 45% range in all directions. The stem, canopy and fixture shall be capable of 45% swing.

3.17.3 Ballasts

Remote type ballasts or transformers, where indicated, shall be mounted in a well ventilated, easily accessible location, within the maximum operating distance from the lamp as designated by the manufacturer.

3.17.4 Emergency Light Sets

Emergency light sets shall conform to UL 924 with the number of heads as indicated. Sets shall be permanently connected to the wiring system by conductors installed in short lengths of flexible conduit.

3.18 BATTERY CHARGERS

Battery chargers shall be installed in conformance with NFPA 70.

3.19 EQUIPMENT CONNECTIONS

Wiring not furnished and installed under other sections of the specifications for the connection of electrical equipment as indicated on the drawings shall be furnished and installed under this section of the specifications. Connections shall comply with the applicable requirements of paragraph WIRING METHODS. Flexible conduits 6 feet or less in length shall be provided to all electrical equipment subject to periodic removal, vibration, or movement and for all motors. All motors shall be provided with separate grounding conductors. Liquid-tight conduits shall be used in damp or wet locations.

3.19.1 Motors and Motor Control

Motors, motor controls, and motor control centers shall be installed in accordance with NFPA 70, the manufacturer's recommendations, and as indicated. Wiring shall be extended to motors, motor controls, and motor control centers and terminated.

3.19.2 Installation of Government-Furnished Equipment

Transport, deliver, store, if required, and install all Government-furnished equipment. Wiring shall be extended to the equipment and terminated.

3.19.3 Food Service Equipment Provided Under Other Sections

Wiring shall be extended to the equipment and terminated.

3.20 CIRCUIT PROTECTIVE DEVICES

The Contractor shall calibrate, adjust, set and test each new adjustable circuit protective device to ensure that they will function properly prior to the initial energization of the new power system under actual operating conditions.

3.21 PAINTING AND FINISHING

Field-applied paint on exposed surfaces shall be provided under Section 09900 PAINTING, GENERAL.

3.22 REPAIR OF EXISTING WORK

The work shall be carefully laid out in advance, and where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceiling, or other surfaces is necessary for the proper installation, support, or anchorage of the conduit, raceways, or other electrical work, this work shall be carefully done, and any damage to building, piping, or equipment shall be repaired by skilled mechanics of the trades involved at no additional cost to the Government.

3.23 FIELD TESTING

Field testing shall be performed in the presence of the Contracting Officer. The Contractor shall notify the Contracting Officer 15 days prior to conducting tests. The Contractor shall furnish all materials, labor, and equipment necessary to conduct field tests. The Contractor shall perform all tests and inspection recommended by the manufacturer unless specifically waived by the Contracting Officer. The Contractor shall maintain a written record of all tests which includes date, test performed, personnel involved, devices tested, serial number and name of test equipment, and test results. All field test reports will be signed and dated by the Contractor.

3.23.1 Safety

The Contractor shall provide and use safety devices such as rubber gloves, protective barriers, and danger signs to protect and warn personnel in the test vicinity. The Contractor shall replace any devices or equipment which are damaged due to improper test procedures or handling.

3.23.2 Ground-Resistance Tests

The resistance of each grounding electrode shall be measured using the

fall-of-potential method defined in IEEE Std 81. Soil resistivity in the area of the grid shall be measured concurrently with the grid measurements. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

a. Single rod electrode - 25 ohms.

3.23.3 Ground-Grid Connection Inspection

All below-grade ground-grid connections will be visually inspected by the Contracting Officer before backfilling. The Contractor shall notify the Contracting Officer 24 hours before the site is ready for inspection.

3.23.4 Motor Tests

- a. Phase rotation test to ensure proper directions.
- b. Operation and sequence of reduced voltage starters.
- c. High potential test on each winding to ground.
- d. Insulation resistance of each winding to ground.
- e. Vibration test.
- f. Dielectric absorption test on motor and starter.

3.23.5 Circuit Breaker Tests

The following field tests shall be performed on circuit breakers.

3.23.6 Protective Relays

Protective relays shall be visually and mechanically inspected, adjusted, tested, and calibrated in accordance with the manufacturer's published instructions. These tests shall include pick-up, timing, contact action, restraint, and other aspects necessary to insure proper calibration and operation. Relay settings shall be implemented in accordance with the coordination study. Relay contacts shall be manually or electrically operated to verify that the proper breakers and alarms initiate. Relaying current transformers shall be field tested in accordance with IEEE C57.13.

3.24 OPERATING TESTS

After the installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct operating tests for approval. The equipment shall be demonstrated to operate in accordance with the specified requirements. An operating test report shall be submitted in accordance with paragraph FIELD TEST REPORTS.

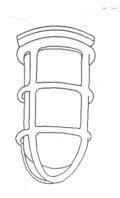
3.25 ACCEPTANCE

Final acceptance of the facility will not be given until the Contractor has successfully completed all tests and after all defects in installation, material or operation have been corrected.

-- End of Section --







TYPE 106 Integral Outlet Box

TYPE 107 Exposed Gasketed Outlet Box

TYPE 108 Concealed Standard Outlet Box

Enclosed and Gasketed (Vapor-tight) Industrial Incandescent Fixtures

Suffix	Description
\mathbf{A}	Ceiling mounted
В	Wall mounted
C	Pendant mounted

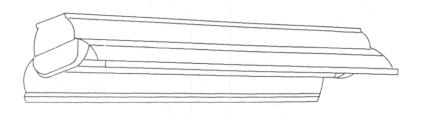
Type 106 fixture body shall be constructed with an enclosed and gasketed chamber as an integral part of the body which shall serve as an outlet box. Fixture shall be suitable for wet locations.

Type 107 fixture shall be suitable for mounting on an exposed, enclosed, and gasketed conduit outlet box. Fixture shall be suitable for wet locations.

Type 108 fixture shall be suitable for mounting on a concealed standard outlet box. Fixture shall be suitable for wet locations.

Type 106, 107, and 108 fixtures shall conform to UL 1571 and shall be provided with a cast aluminum guard of adequate rigidity and strength. A guard shall be attached to the fixture so that its permanence of position is assured. Wattage rating of the fixture shall be as indicated on contract documents.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

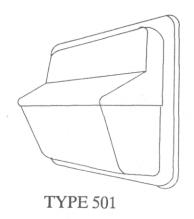


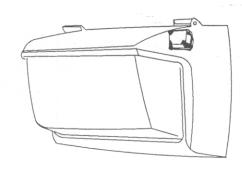
TYPE 230 Suspension Mounted, Industrial, Open Type Fluorescent Fixture, 4-Foot

First-Suffix	Second-Suffix	Description
A B	1 2	Two lamps Three lamps 8 to 15 percent uplight 18 to 25 percent uplight

Fixture shall conform to UL 1570. Standard ballast(s) shall be the Class P, high power factor type approved for the application by the Certified Ballast Manufacturers. Channel housing, end fittings, and reflector shall be constructed with die-formed, cold-rolled steel. Reflector finish shall be porcelain enamel, baked white enamel or aluminum oxide. Sockets shall be of the type requiring a forced movement along the longitudinal axis of the lamp for insertion and removal of the lamp. Fixture shall be prewired. Fluoresent tubes shall be protected by a virgin acrylic protective sleeve and clear plastic vented end caps.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.





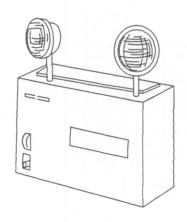
TYPE 502

High Intensity Discharge Fixture for Exterior Wall Mounting, Medium Output

Suffix	Description
A	Rated for:
B	50 watt high pressure sodium lamp 70 watt high pressure sodium lamp
C	100 watt high pressure sodium lamp
D	150 watt high pressure sodium lamp
E	175 watt metal halide lamp

Fixture shall conform to UL 1572 and shall be rated for use in wet locations. The fixture housing, door assembly, and backplate shall be die-cast aluminum. The door assembly shall have integral cast aluminum hinges. The door assembly shall be held securely to the fixture housing with a stainless steel safety strap when the door is in the open position. The door assembly shall be held firmly against a sealing gasket between the fixture door and housing by stainless steel latches or with stainless steel or brass captive screws when the fixture door is closed. The refractor shall be prismatic borosilicate glass or polycarbonate resin. The refractor shall be gasketed and securely held in the door frame, but shall be easily removed for replacement with a common tool. The reflector shall be aluminum with the manufacturer's standard commercial product finish suitable for the type and rating of the lamp. The fixture shall have manufacturers standard protective coating. Cast knockouts shall be provided in the backplate for recessed outlet box mounting. Ballast shall be of the high power factor type. Ballast shall be of the lead-peak autotransformer type metal halide for lamps and the regulating type for high pressure sodium lamps. Ballast shall be capable of starting and operating the lamp at ambient temperatures from minus 20 degrees F to 105 degrees F. The fixture shall be prewired, and shall have a field adjustable, mogul base glazed porcelain lampholder.

Fixture types indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 603

6-Volt Emergency Battery Pack Unit with Two Floodlights

Unit shall conform to UL 924, NFPA 101, and shall meet or exceed the NFPA 70 time and voltage requirements. The unit shall be dual-rated for use on either 120-Volt or 277-Volt alternating current power supplies. Following sustained loss of the normal power supply, the unit shall be capable of automatically and instantaneously illuminating the two 6-Volt lighting fixtures for a period of not less than 90 minutes at a battery voltage in excess of 87.5 percent of the nominal voltage rating. The battery shall be the nickel-cadmium, pocket plate type designed to be maintenance free during the expected battery life, and shall be warranted for not less than 3 years from the date of the purchase of the unit, and shall be field replaceable without requiring removal of other components. The battery charger shall be the solid-state type and shall provide a continuous, variable, current limited, filtered and regulated charge rate. The battery and charger shall be contained in a steel cabinet not less than 18 gauge thickness with an enamel finish, unless otherwise approved, which shall be equipped with a push-to-test switch and a meter to indicate battery voltage when the switch is closed. Mounting brackets or shelf shall be provided, complete with all mounting hardware, all with a finish to match the finish or color of the cabinet. The unit shall be prewired and equipped with two 6-volt, 5-8 watt floodlights as indicated.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.



TYPE 602

Remote Mounted, 12 Volt Exit Sign, For Use With Type 600 Power Supply Unit

First Suffix Second Suffix	Description
A B	Single face Double face
$\frac{1}{2}$	End mounted Top mounted
3	Back mounted
4	Stem mounted

Fixture shall conform to UL 924, UL 1571, and NFPA 101, and shall be equipped for downlighting as indicated. The illuminated exit sign housing shall be constructed of die-cast aluminum and shall have a satin anodized finish. Each stenciled face shall have 6-inch letters with 3/4-inch stroke and shall have a brushed aluminum finish and clear acrylic lacquer protective coating. Concealed universal arrows may be below or aligned with the center of the EXIT letters. The fixture shall have provisions for two 20-watt incandescent lamps to be illuminated during normal fixture use, and two 5-8 watt DC lamps to be illuminated during outage of the normal power source. Lamps shall be provided with the fixture, and shall be sufficient to properly illuminate the EXIT letters through a green or red polymer diffuser, as indicated on applicable drawings. Fixture shall be the manufacturer's standard commercial fixture suitable for the application indiated. Mounting hardware shall be provided for the type mounting indicated on other contract documents, and shall be finished to match the housing finish. The fixture shall be prewired.

Fixture type indicated on this sheet shall also conform to requirements specified and indicated in the contract documents.

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SECTION 16528

EXTERIOR LIGHTING INCLUDING SECURITY AND CCTV APPLICATIONS 06/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO LTS-3 (1994) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C78.1	(1991; C78.1a; R 1996) Fluorescent Lamps - Rapid-Start Types - Dimensional and Electrical Characteristics
ANSI C78.40	(1992) Specifications for Mercury Lamps
ANSI C78.1350	(1990) Electric Lamps - 400-Watt, 100-Volt, S51 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1351	(1989) Electric Lamps - 250-Watt, 100-Volt S50 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1352	(1990) Electric Lamps - 1000-Watt, 250-Volt, S52 Single-Ended High-Pressure Sodium Lamps
ANSI C78.1355	(1989) Electric Lamps - 150-Watt, 55-Volt S55 High-Pressure Sodium Lamps
ANSI C78.1375	(1996) 400-Watt, M59 Single-Ended Metal-Halide Lamps
ANSI C78.1376	(1996) 1000-Watt, M47 Metal-Halide Lamps
ANSI C80.1	(1995) Rigid Steel Conduit - Zinc Coated
ANSI C82.4	(1992) Ballasts for

	High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
ANSI C119.1	(1986; R 1997) Sealed Insulated Underground Connector Systems Rated 600 Volts
ANSI C135.1	(1979) Galvanized Steel Bolts and Nuts for Overhead Line Construction
ANSI C135.14	(1979) Staples with Rolled or Slash Points for Overhead Line Construction
ANSI C135.30	(1988) Zinc-Coated Ferrous Ground Rods for Overhead or Underground Line Construction
ANSI C136.2	(1996) Luminaires, Voltage Classification Roadway Lighting Equipment
ANSI C136.3	(1995) Roadway Lighting Equipment-Luminaire Attachments
ANSI C136.6	(1997) Roadway Lighting Equipment - Metal Heads and Reflector Assemblies - Mechanical and Optical Interchangeability
ANSI C136.9	(1990) Roadway Lighting - Socket Support Assemblies for Use in Metal Heads - Mechanical Interchangeability
ANSI C136.10	(1996) Roadway Lighting- Locking-Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing
ANSI C136.11	(1995) Multiple Sockets for Roadway Lighting Equipment
ANSI C136.15	(1986) Roadway Lighting, High-Intensity-Discharge and Low-Pressure Sodium Lamps in Luminaires -
ANSI C136.20	(1990) Roadway Lighting Equipment - Fiber Reinforced Plastic (FRP) Fiber Lighting Poles
ANSI 05.1	(1992) Specifications and Dimensions for Wood Poles
AMERICAN SOCIETY FOR T	ESTING AND MATERIALS (ASTM)
ASTM A 36	(1997a) Carbon Structural Steel
ASTM A 48	(1994a) Gray Iron Castings

ASTM A 82	(1997) Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A 123	(1997a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 575	(1996) Steel Bars, Carbon, Merchant Quality, M-Grades
ASTM A 576	(1990b; R 1995) Steel Bars, Carbon, Hot-Wrought, Special Quality
ASTM A 641	(1997) Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
ASTM B 2	(1994) Medium-Hard-Drawn Copper Wire
ASTM B 8	(1995) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B 117	(1997) Operating Salt Spray (Fog) Apparatus
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM D 1654	(1992) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
AMERICAN WOOD-PRESERVER	S' ASSOCIATION (AWPA)
AWPA C4	(1995) Poles - Preservative Treatment by Pressure Processes
AWPA C25	(1995) Sawn Crossarms - Preservative Treatment by Pressure Processes
AWPA P1/P13	(1995) Standard for Coal Tar Creosote for Land and Fresh Water and Marine (Coastal Water Use)

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

AWPA P8

AWPA P9

EIA ANSI/EIA/TIA 232-F (1997) Interface Between Data Terminal

Preservatives

Preservative Systems

(1997) Standards for Oil-Borne

(1997) Standards for Solvents for Organic

Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

IESNA RP-8	(1983; R	1993)	Roadway	Lighting

IEWNA RP-20 (1998) Lighting for Parking Facilities

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2 (1	1997)	National	Electrical	Safety Code
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IEEE C62.41 (1991; R 1995) Surge Voltages in Low-Voltage AC Power Circuits

IEEE C136.13 (1987; R 1997) Metal Brackets for Wood

Poles

IEEE Std 81 (1983) Guide for Measuring Earth

Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

(Part 1)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(1991) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 1	(1993) Industrial Control and Systems
NEMA ICS 2	(1993) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC Assemblies
NEMA ICS 6	(1993) Industrial Control and Systems, Enclosures
NEMA OS 1	(1996) Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
NEMA OS 2	(1986; Errata Aug 1986; R 1991) Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
NEMA RN 1	(1989) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC 6	(1990) PVC and ABS Plastic Utilities Duct for Underground Installation

NEMA TC 9 (1990) Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

	UNDERWRITERS LABORATORI	ES (OI)
UL 6		(1997) Rigid Metal Conduit
UL 44		(1997; Rev Mar 1999) Rubber-Insulated Wires and Cables
UL 98		(1994; Rev thru Jun 1998) Enclosed and Dead-Front Switches
UL 467		(1993; Rev Aug 1996) Grounding and Bonding Equipment
UL 486A		(1997; Rev thru Dec 1998) Wire Connectors and Soldering Lugs for Use with Copper Conductors
UL 486B		(1997; Rev Jun 1997) Wire Connections for Use with Aluminum Conductors
UL 506		(1994; Rev thru Oct 1997) Specialty Transformers
UL 514A		(1996; R Jul 1998) Metallic Outlet Boxes
UL 514B		(1996; R Oct 1998) Fittings for Conduit and Outlet Boxes
UL 514C		(1996; R Sep 1998) Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 651		(1995; Rev thru Oct 1998) Schedule 40 and 80 Rigid PVC Conduit
UL 651A		(1995; Rev thru Apr 1998) Type EB and A Rigid PVC Conduit and HDPE Conduit
UL 854		(1996; Rev Apr 1998) Service-Entrance Cables
UL 870		(1995; Rev Jun 1998) Wireways, Auxiliary Gutters, and Associated Fittings
UL 886		(1994; Rev thru Apr 1999) Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations

UL 1029	(1994; Rev thru Dec 1997) High-Intensity-Discharge Lamp Ballasts
UL 1449	(1996; Rev thru Oct 1998) Transient Voltage Surge Suppressors
UL 1571	(1995; Rev thru Jun 1997) Incandescent Lighting Fixtures
UL 1572	(1995; Rev thru Jun 1997) High Intensity Discharge Lighting Fixtures

1.2 SYSTEM DESCRIPTION

1.2.1 Lighting System

The lighting system shall be configured as specified and shown. The system shall include all fixtures, hardware, poles, cables, connectors, adapters and appurtenances needed to provide a fully functional lighting system.

1.2.2 Electrical Requirements

The equipment shall operate from a voltage source as shown, plus or minus 10 percent, and 60 Hz, plus or minus 2 percent.

1.2.3 Interface Between Lighting System and Power Distribution

Conductors shall include all conductors extending from the load side of the primary and secondary power panels that serve assessment lighting equipment and be as indicated.

1.2.4 Nameplates

Each major component of equipment shall have a nonferrous metal or engraved plastic nameplate which shall show, as a minimum, the manufacturer's name and address, the catalog or style number, the electrical rating in volts, and the capacity in amperes or watts.

1.2.5 Standard Products

Materials and equipment shall be standard products of manufacturer regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.2.6 Protection of Security Lighting System Components

1.2.6.1 Components and Conductors

Lighting system conductors shall be protected from damage. Lighting system conductors shall be installed in raceways or by means of direct burial, as shown. Where the conductors leave the underground systems, the conductors shall be in rigid steel conduit of the indicated size. A NEMA ICS 6, Type 4 enclosure shall house exterior group-located electrical equipment such as

time switches, safety switches, and magnetic contactors. Where only one piece of equipment is being provided at a location, the equipment shall be provided with its own enclosure.

1.3 CORROSION PROTECTION

1.3.1 Ferrous Metal Materials

1.3.1.1 Hardware

Ferrous metal hardware shall be hot-dip galvanized in accordance with ASTM A 153 and ASTM A 123.

1.3.1.2 Equipment

Equipment and component items, including but not limited to metal poles and ferrous metal luminaires not hot-dip galvanized or porcelain enamel finished, shall be provided with corrosion-resistant finishes which shall withstand 120 hours of exposure to the salt spray test specified in ASTM B 117 without loss of paint or release of adhesion of the paint primer coat to the metal surface in excess of 1/16 inch from the test mark. The scribed test mark and test evaluation shall have a rating of not less than 7 in accordance with TABLE 1, (procedure A) of ASTM D 1654. Cut edges or otherwise damaged surfaces of hot-dip galvanized sheet steel or mill galvanized sheet steel shall be coated with a zinc rich paint conforming to the manufacturer's standard.

1.3.2 Finishing

Painting required for surfaces not otherwise specified and finish painting of items only primed at the factory, shall be as specified in Section 09900 PAINTING, GENERAL.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment and Materials; GA.

Data published by the manufacturer of each item on the list of equipment and material, to permit verification that the item proposed is of the correct size, properly rated or applied, or is otherwise suitable for the application and fully conforms to the requirements specified.

SD-04 Drawings

Lighting System; GA.

Detail drawings for the complete system and for poles, lighting fixtures,

bracket arms, cable boxes, handholes, transformers, and controllers. Detail drawings for precast handholes and service cabinets for foundations shall include a design analysis to determine that strength is equivalent to indicated cast-in-place concrete handholes and foundations.

PART 2 PRODUCTS

2.1 STANDARD PRODUCT

Material and equipment shall be the standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Items of the same classification shall be identical including equipment, assemblies, parts, and components.

2.2 BRACKET ARMS

2.2.1 On Aluminum, Steel, Fiberglass, and Concrete Poles

Poles shall be provided with bracket arms of the support-arm style and of the length indicated on drawings. Bracket arms shall conform to the design of the pole provided. The bracket arms shall be capable of supporting the equipment to be mounted on it with the maximum wind and ice loading encountered at the site. Strength of bracket arms shall be in accordance with IEEE C136.13. Steel brackets shall be galvanized. Wood bracket arms shall not be used.

2.2.2 Floodlight Brackets

Floodlight brackets shall be coordinated with the floodlight support provided.

2.3 CABLE

The Contractor shall provide all wire and cable not indicated as government furnished equipment. Wire and cable components shall be able to withstand the jobsite environment for a minimum of 20 years.

2.3.1 Insulated Cable

Cable shall be type USE conforming to UL 854, with copper conductors and type RHW or XHHW insulation conforming to UL 44, and shall include green ground conductor. Cable shall be provided with insulation of a thickness not less than that given in TABLE 15.1 of UL 854. Cable shall be rated 600 volts. Parts of the cable system such as splices and terminations shall be rated not less than 600 volts. The size and number of conductors and the number of cables shall be as indicated. Conductors larger than No. 8 AWG shall be stranded.

2.3.2 Bare Copper Conductors

Medium-hard-drawn copper conductors shall conform to ASTM B 2 and ASTM B 8.

2.4 CABLE SPLICES AND CONNECTORS

Cable splices and connectors shall conform to UL 486A. Underground splices and connectors shall also conform to the requirements of ANSI C119.1.

2.5 MANHOLES, HANDHOLES, AND PULLBOXES

Manholes, handholes, and pullboxes shall be as indicated. Strength of manholes, handholes, and pullboxes and their frames and covers shall conform to the requirements of IEEE C2. Precast concrete manholes shall have the required strength established by ASTM C 478. Frames and covers for manholes shall be made of gray cast iron or cast steel. A machine-finished seat shall be provided to ensure a matching joint between frame and cover. Cast iron shall comply with ASTM A 48, Class 30B, minimum. Handholes for low voltage cables installed in parking lots, sidewalks, and turfed areas shall be from an aggregate consisting of sand and with continuous woven glass strands having an overall compressive strength of at least 10,000 psi and a flexural strength of at least 5,000 psi. Pullbox and handhole covers in parking lots, sidewalks, and turfed areas shall be of the same material as the box. Concrete pullboxes shall consist of precast reinforced concrete boxes, extensions, bases, and covers. A sufficient number of tamperproof bolts shall be installed to hold the cover firmly in place along the entire surface of contact; a tool for the tamperproof bolts shall be furnished.

2.6 CONDUIT, DUCTS AND FITTINGS

2.6.1 Conduit, Rigid Steel

Rigid steel conduit shall conform to ANSI C80.1 and UL 6.

2.6.2 Conduit Coatings

Underground metallic conduit and fittings shall be coated with a plastic resin system conforming to NEMA RN 1, Type 40. Epoxy systems may also be used.

- 2.6.3 Conduit Fittings and Outlets
- 2.6.3.1 Boxes, Metallic Outlets

NEMA OS 1 and UL 514A.

2.6.3.2 Boxes, Nonmetallic, Outlet and Flush-Device Boxes and Covers

NEMA OS 2 and UL 514C.

2.6.3.3 Boxes, Switch (Enclosed), Surface Mounted

UL 98.

2.6.3.4 Fittings for Conduit and Outlet Boxes

UL 514B.

2.6.3.5 Fittings, PVC, for Use with Rigid PVC Conduit and Tubing UL 514B.

2.6.4 Non-Metallic Duct

Non-metallic duct lines and fittings utilized for underground installation shall be suitable for the application. Duct shall be thick-wall, single, round-bore type. Material of one type shall be used.

Acrylonitrile-butadiene-styrene (ABS) duct shall conform to NEMA TC 6and NEMA TC 9. High-density conduit shall conform to UL 651A. Schedule 40 polyvinyl chloride (PVC) shall conform to UL 651. Plastic utility duct and fittings manufactured without a UL label or listing shall be provided with a certification as follows: "The materials are suitable for use with 167 degree F wiring. No reduction of properties in excess of that specified for materials with a UL label or listing will be experienced if samples of the finished product are operated continuously under the normal conditions that produce the highest temperature in the duct."

2.7 GROUND RODS

Ground rods shall be of copper clad steel conforming to UL 467 not less than 5/8 inch in diameter by 10 feet in length of the sectional-type driven full length into earth.

2.8 POLES

Metal and concrete poles shall be the pole manufacturer's standard design for supporting the number of fixtures indicated. Poles shall be designed for a wind velocity of 80 mph at the base of the pole, for a wind gust factor of 1.3, and for the height and drag factors recommended by AASHTO LTS-3. The effective projected area of luminaires and other pole-mounted devices shall be taken into account in pole design. Poles shall have grounding provisions. The type of pole shaft material provided shall not be mixed on any project. Grounding connection shall be provided near the bottom of each metal pole and at each concrete pole anchor base. Scratched, stained, chipped, or dented poles shall not be installed.

2.8.1 Steel Poles

Steel poles shall be hot-dip galvanized in accordance with ASTM A 123 and shall not be painted. Poles shall have tapered tubular members, either round in cross-section or polygonal. Pole shafts shall be one piece. Poles shall be welded construction with no bolts, rivets, or other means of fastening except as specifically approved. Pole markings shall be approximately 3 to 4 feet above grade and shall include manufacturer, year of manufacture, top and bottom diameters, length, and a loading tree. Attachment requirements shall be provided as indicated, including grounding provisions. Climbing facilities are not required. Bases shall be of the anchor bolt-mounted type.

2.8.2 Concrete Poles

Concrete poles shall be designed to withstand the loads specified in IEEE C2

multiplied by the appropriate overload capacity factors. Poles shall be prestressed and spun. Spun poles shall be manufactured by a centrifugal spinning process with concrete pumped into a polished round tapered metal mold. An air entrainment admixture shall be used to produce a 6% +/- air content to the concrete mix. Concrete for spun poles shall have a compressive strength of at least 8,000 psi at 28 days; steel wire shall have an ultimate tensile strength of at least 120,000 psi; and reinforcing bars shall have an ultimate tensile strength of at least 40,000 psi. Pre-stressing steel reinforcement shall be stressed to a maximum of 70% of their ultimate capacity, and shall not be released until a minimum compressive strength of 3,500 psi has been achieved. Helical reinforcing shall conform to ASTM A 82 with hot dip galvanized coating in accordance with ASTM A 641, Class 3. After the high speed spinning action is completed, a spun pole shall be cured by a suitable wet steam process. Spun poles shall have a water absorption of not greater than 3 percent to eliminate cracking and to prevent erosion. Concrete poles shall have hollow shafts. Poles shall have a hard, smooth, nonporous surface that is resistant to soil acids, road salts, and attacks of water and frost. The pole shaft shall be coated with a waterproof breathing membrane of methyl methacrylate and once with an anti-graffiti coating. Poles shall not be installed for at least 15 days after manufacture. Fittings and brackets that conform to the concrete pole design shall be provided. Poles shall conform to strength calculations performed by a registered professional engineer and submitted in accordance with detail drawings portion of paragraph SUBMITTALS.

2.8.3 Anchor Bolts

Anchor bolts shall be the pole manufacturer's standard, but not less than necessary to meet the pole wind and ice loading, herein and other specified design requirements.

2.9 ELECTRICAL ENCLOSURES

The Contractor shall provide metallic enclosures as needed to house the lighting equipment. Enclosures shall conform to NEMA ICS 6 and NEMA 250. Enclosures shall be provided with lockable or padlock handles. Keys for lockable enclosures shall be delivered to the Contracting Officer. The enclosures shall be as specified or as shown on the drawings.

2.9.1 Interior Enclosures

Enclosures to house lighting equipment in an interior environment shall meet the requirements of a NEMA 12 enclosure as defined in NEMA 250.

2.9.2 Exposed-to-Weather Enclosures

Enclosures to house lighting equipment in an outdoor environment shall meet the requirements of a NEMA 4 enclosure as defined in NEMA 250.

2.10 ILLUMINATION

2.10.1 General Lighting

Luminaires, ballasts, lamps, and control devices required for area

lighting, including floodlighting shall be in accordance with the details and descriptions shown on the drawings.

2.11 LAMPS AND BALLASTS, HIGH INTENSITY DISCHARGE (HID) SOURCES

2.11.1 High-Pressure Sodium

Lamps shall conform to ANSI C78.1350 and ANSI C78.1355. Ballasts shall conform to ANSI C82.4, or UL 1029. High-pressure sodium lamps shall be clear.

2.12 LUMINAIRE COMPONENTS

Luminaire components shall conform to the following: attachments, ANSI C136.3; voltage classification, ANSI C136.2; field identification marking, ANSI C136.15; interchangeability, ANSI C136.6 and ANSI C136.9; and sockets, ANSI C136.11.

2.13 LIGHTING CONTROL EQUIPMENT

2.13.1 Photo-Control Devices

Photo-control devices shall conform to ANSI C136.10. Each photo-control element shall be a replaceable, weatherproof, plug-in or twist-lock assembly adjustable operation range of approximately 0.5 to 5.0 foot-candles.

2.13.2 Timer Control Switches

Astronomic dial type arranged to turn "ON" at sunset, and turn "OFF" at a pre-determined time between 2200 hours and 2300 hours hours, automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise shall be provided. A switch rated 300 volts, having automatically wound spring mechanism to maintain accurate time for a minimum of 7 hours following a power failure shall be provided. A time switch with a manual on-off bypass switch shall be provided. Housing for the time switch shall be a surface mounted, NEMA 4 (outdoor) enclosure conforming to NEMA ICS 6.

2.13.3 Manual Control Switches

Manual control switches shall conform to UL 98. The switches shall be the heavy-duty type and shall be suitable for operation on a 120 volt, 60 Hz system. The number of poles and ampere rating shall be as indicated. Switch construction shall be such that a screwdriver will be required to open the switch door when the switch is on. The selector switch shall have a minimum of three positions: ON, OFF, and AUTOMATIC. The automatic selection shall be used when photoelectric or timer control is desired. The selector switch shall interface with the lighting system magnetic contactor and control its activity.

2.13.4 Magnetic Contactor

Magnetic contactors shall be mechanically held, electrically operated, and

shall conform to NEMA ICS 1 and NEMA ICS 2. The contactor shall be suitable for 120 volts, single phase, 60 Hz. Coil voltage shall be 120 volts. Maximum continuous ampere rating and number of poles shall be as indicated on drawings. Enclosures for contactors mounted indoors shall be NEMA ICS 6, Type 1. Each contactor shall be provided with a spare, normally open auxiliary contact. Terminal lugs shall be coordinated with the wire size.

2.14 PHOTOMETRIC DISTRIBUTION CLASSIFICATION

Photometrics shall conform to IESNA RP-8.

2.15 LUMINAIRES, FLOODLIGHTING

2.15.1 HID and Incandescent

HID lighting fixtures shall conform to UL 1572. Incandescent lighting fixtures shall conform to UL 1571.

2.16 FIXTURES

Special fixtures shall be as indicated on the drawings. Illustrations and descriptions shown on these sheets or on the drawings are indicative of the general type desired and are not intended to restrict selection to fixtures of any particular manufacturer. Fixtures of similar design, equivalent light distribution and brightness characteristics, equal finish and quality will be acceptable as approved.

2.16.1 Accessories

Accessories such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

2.16.2 In-Line Fuse

An in-line fuse shall be provided for each fixture, and shall consist of a fuse and a UL approved waterproof fuse holder rated at 30 amperes, 600 volts, with insulated boots. Fuse rating shall be 600 volts.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall install all system components, including government furnished equipment, and appurtenances in accordance with the manufacturer's instructions, IEEE C2, and contract documents, and shall furnish necessary hardware, fixtures, cables, wire, connectors, interconnections, services, and adjustments required for a complete and operable system.

3.1.1 Current Site Conditions

The Contractor shall verify that site conditions are in agreement with the

design package. The Contractor shall report all changes to the site or conditions that will affect performance of the system to the Government. The Contractor shall not take any corrective action without written permission from the Government.

3.1.2 Existing Equipment

The Contractor shall connect to and utilize existing lighting equipment and devices as shown. Lighting equipment that is usable in their original configuration without modification may be reused with Government approval. The Contractor shall perform a field survey, including testing and inspection of existing lighting equipment and control lines intended to be incorporated into the lighting system, and furnish a report to the Government. For those items considered nonfunctioning, specification sheets, or written functional requirements to support the findings and the estimated cost to correct the deficiency shall be provided with the report. As part of the report, the Contractor shall include the scheduled need date for connection to all existing equipment. The Contractor shall make written requests and obtain approval prior to disconnecting any control lines and equipment, and creating equipment downtime. Such work shall proceed only after receiving Government approval of these requests. If any device fails after the Contractor has commenced work on that device, the Contractor shall diagnose the failure and perform any necessary corrections to the equipment. The Government is responsible for maintenance and repair of Government equipment. The Contractor shall be held responsible for repair costs due to Contractor negligence or abuse of Government equipment.

3.2 ENCLOSURE PENETRATIONS

Enclosure penetrations shall be from the bottom unless the system design requires penetrations from other directions. Penetrations of interior enclosures involving transitions of conduit from interior to exterior, and penetrations on exterior enclosures shall be sealed with rubber silicone sealant to preclude the entry of water. The conduit riser shall terminate in a hot-dipped galvanized metal cable terminator. The terminator shall be filled with an approved sealant as recommended by the cable manufacturer, and in such a manner that the cable is not damaged.

3.3 PREVENTION OF CORROSION

3.3.1 Aluminum

Aluminum shall not be used in contact with earth or concrete, and where connected to dissimilar metal, shall be protected by approved fittings and treatment.

3.3.2 Steel Conduits

Steel conduits shall not be installed within concrete slabs-on-grade. Steel conduits installed underground or under slabs-on-grade, or penetrating slabs-on-grade, shall be field wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50 percent overlap, or shall have a factory-applied plastic resin, epoxy coating. Zinc coating may be omitted from steel conduit which has a factory-applied epoxy coating.

3.4 CABLE INSTALLATION

Cable and all parts of the cable system such as splices and terminations shall be rated not less than 600 volts. The size and number of conductors and the number of cables shall be as indicated. Conductors larger than No. 8 AWG shall be stranded. Each circuit shall be identified by means of fiber or nonferrous metal tags, or approved equal, in each handhole and junction box, and at each terminal.

3.4.1 Splices

Splices below grade shall be made with nonpressure-filled resin systems using transparent, interlocking, self-venting, longitudinally split plastic molds. Splices above grade shall be made with sealed insulated pressure connectors and shall provide insulation and jacket equal to that of the cable. In order to prevent moisture from entering the splice, jackets shall be cut back to expose the required length of insulation between the jacket and the tapered end of the insulation.

3.4.2 Installation in Duct Lines

Ground and neutral conductors shall be installed in duct with the associated phase conductors. Cable splices shall be made in handholes only.

3.4.3 Direct Burial

Minimum cover from top of cable to finished grade shall be 30 inches for direct buried cable, but not less than the depth of the frost line.

3.4.3.1 Trenching

Trenches shall be excavated to the depths required to provide the minimum cable cover. The bottom of the trench shall be smooth and free of stones and sharp objects. Where the bottom of the trench consists of material other than sand or earth, an additional 3 inch layer shall be removed and replaced by a 3 inch layer of sand or stone-free earth compacted to the approximate density of the surrounding firm soil. The cables shall be unreeled in place along the side of or in the trench and carefully placed on the sand or earth bottom. Pulling cables into a direct-burial trench from a fixed reel position will not be permitted. Where cables cross, a separation of at least 3 inches shall be provided, unless the cables are protected by nonmetallic conduit sleeves at the crossing. The radius of bends in cables shall be not less than 12 times the diameter of the cable. Cables shall not be left under longitudinal tension. The first layer of backfill shall be 6 inches thick and shall consist of sand or stone-free earth. One-inch untreated planks, not less than 8 inches in width, or approved equal protection, shall be placed end to end along the cable run, approximately 3 inches above the cable. A 5 mil, brightly colored plastic tape not less than 3 inchesin width and suitably inscribed at not more than 10 feet on centers, or other approved dig-in warning indication, shall be placed approximately 12 inches below finished grade levels of trenches. Selected backfill of sand or stone-free earth shall be provided to a minimum depth of 3 inches above cables.

3.4.3.2 Requirements for Installation in Duct

Where indicated on drawing, cable shall be installed in duct lines. Ground and neutral conductors shall be installed in duct with the associated phase conductors. The segments of direct-burial cable that cross under new railroad tracks, roads, or paving exceeding 5 feet in width, shall be installed in plastic, or rubber duct encased in concrete in accordance with paragraph DUCT LINES. Pulling of cable into conduit from a fixed reel position will be permitted. At interfaces with direct-burial cable, the direct-burial cable shall be centered in the entrance to the duct, using an approved waterproof, nonhardening mastic compound to facilitate the centering.

3.5 CONNECTIONS TO BUILDINGS

Cables shall be extended into the various buildings as indicated and shall be properly connected to the indicated equipment. Empty conduits to the indicated equipment from a point 5 feet outside the building wall and 2 feet below finished grade are specified in Section 16415 ELECTRICAL WORK, INTERIOR. After installation of cables, conduits shall be sealed to prevent moisture or gases from entering the building.

3.6 POLE INSTALLATION

Pole lengths shall provide a luminaire mounting height as indicated on the drawings. Electrical cabling shall be provided to the light pole as specified in Section 2.3. The mount interfaces shall have ac power connected, and the pole wiring harness shall be connected to the luminaire. Pole installation shall conform to the manufacturer's recommendations, NFPA 70, and IEEE C2. Poles shall be set straight and plumb.

3.6.1 Pole Brackets

Brackets shall be installed as specified by the manufacturer and as shown on drawings. Mounting hardware shall be sized appropriately to secure the mount, luminaire, and housing with wind and ice loading normally encountered at the site. Pole brackets for floodlights shall have the number of tenons indicated, arranged to provide the indicated spread between each tenon. Where indicated on drawings, adjustable heads shall be installed on the brackets to position the luminaires. Identical brackets shall be used with one type of luminaire.

3.6.2 Concrete Foundations

Concrete foundations shall have anchor bolts accurately set in the foundation using a template supplied by the pole manufacturer. Once the concrete has cured, the pole shall be set on the foundation, leveled on the foundation bolts, and secured with the holding nuts. Concrete shall be 3000 psi at 28 days.

3.6.3 Steel and Concrete Pole Installation

Poles shall be mounted on cast-in-place foundations. Conduit elbows shall

be provided for cable entrances into pole interiors.

3.6.3.1 Cast-In-Place Foundations

Concrete foundations, sized as indicated, shall have anchor bolts accurately set in foundations using templates supplied by the pole manufacturer. Concrete work is specified in SECTION 03300: CAST-IN-PLACE STRUCTURAL CONCRETE. After the concrete has cured, pole anchor bases shall be set on foundations and leveled by shimming between anchor bases and foundations or by setting anchor bases on leveling nuts and grouting. Poles shall be set plumb. Anchor bolts shall be the manufactures standard, and not less than necessary to meet the pole wind loading and other specified design requirements.

3.7 LIGHTING

3.7.1 Lamps

Lamps of the proper type, wattage, and voltage rating shall be delivered to the project in the original containers and installed in the fixtures just before completion of the project.

3.7.2 Fixture Installation

Standard fixtures shall be installed as detailed on the drawings. Illustrations shown on these sheets or on the drawings are indicative of the general type desired and are not intended to restrict selection of fixtures to any particular manufacturer. Fixtures of similar design, equivalent light-distribution and brightness characteristics, and equal finish and quality will be acceptable as approved.

3.7.2.1 Accessories

Accessories such as straps, mounting plates, nipples, or brackets shall be installed as required for proper installation.

3.7.2.2 In-Line Fuses

An in-line fuse shall be provided for each fixture.

3.8 LIGHTING CONTROL SYSTEM

3.8.1 Photo-Control

Lighting luminaires shall be controlled by a single photo-control element.

3.8.2 Time Control Switches

Switches shall be installed with not less than four 1/4 inch bolts. The use of sheet metal screws will not be allowed.

3.8.3 Manual and Safety Switches

Terminal lugs shall be coordinated with the wire size. Switches shall be securely fastened to the supporting structure or wall using not less than four 1/4 inch bolts. The use of sheet metal screws will not be allowed.

3.8.4 Magnetic Contactors

Terminal lugs shall be coordinated with the wire size. Switches shall be securely fastened to the supporting structure or wall using not less than four 1/4 inch bolts. The use of sheet metal screws will not be allowed.

3.9 GROUNDING

Grounding shall be in conformance with NFPA 70, the contract drawings, and the following. Grounding conductors shall be soft-drawn, stranded copper. Ground rods shall be driven into the earth so that after the installation is complete, the top of the ground rod will be approximately 1 foot below finished grade, except in handholes.

3.9.1 Ground Rods and Pole Butt Electrodes

The resistance to ground shall be measured using the fall-of-potential method described in IEEE Std 81. The maximum resistance of a driven ground rod shall not exceed 25 ohms under normally dry conditions. Whenever the required ground resistance is not met, additional electrodes shall be provided, to achieve the specified ground resistance. The additional electrodes shall be up to three, 10-feet long rods spaced a minimum of 10 feet apart driven perpendicular to grade. In high ground resistance, UL listed chemically charged ground rods may be used. If the resultant resistance exceeds 25 ohms measured not less than 48 hours after rainfall, the Contracting Officer shall be notified immediately. Connections below grade shall be fusion welded. Connections above grade shall be fusion welded or shall use UL 467 approved connectors.

3.9.2 Items to be Grounded

Ground conductors, metallic conduits, junction boxes, and noncurrent-carrying metallic parts of equipment shall be grounded. Connections above grade shall be made with solderless connectors, and those below grade shall be made by a fusion-welding process.

3.9.3 Lighting Pole

One ground rod shall be provided at each pole. Bases of metal or concrete lighting poles shall be connected to ground rods by means of No. 8 AWG bare copper wire. Lighting fixture brackets on wood and concrete poles shall be grounded to a No. 6 AWG bare copper grounding conductor connected to the ground rod.

3.10 TESTS

3.10.1 Operating Test

After the installation is completed and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for

approval. The equipment shall be demonstrated to operate in accordance with the requirements specified. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish instruments and personnel required for the test, and the Government will furnish the necessary electric power.

3.10.2 Ground Resistance Measurements

The resistance to ground shall be measured by the fall-of-potential method described in IEEE Std 81.

The contractor shall maintain a separate set of drawings, elementary diagrams and wiring diagrams of the lighting to be used for "as-built" drawings. This set shall be accurately kept up to date by the Contractor with all changes and additions to the lighting system. In addition to being complete and accurate, this set of drawings shall be kept neat and shall not be used for installation purposes. Upon completion of the as-built drawings, a representative of the Government will review the as-built work with the Contractor. If the as-built work is not complete, the Contractor will be so advised and shall complete the work as required.

-- End of Section --

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DIVISION 16 - ELECTRICAL

SECTION 16600

ELECTRIC DRYERS

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SECTION 16600

ELECTRIC DRYERS 06/02

PART 1 GENERAL

1.1 GENERAL

Applicable provisions of Division 1 shall govern work in this section.

The Contractor shall furnish and install all electric hand dryers as shown on the drawings. Units as manufactured by World Dryer Corporation, or approved equal, shall be used.

PART 2 PRODUCTS

2.1 GENERAL

Hand dryers shall be Model "A".

Cover of dryer shall consist of a one-piece gray iron casting fitted with isolated pushbutton, revolving nozzle and recessed instruction plate.

All exposed portions of iron casting shall be finished with acid resisting porcelain enamel; color as selected by Contracting Officer.

Cover shall be fastened by two recessed allen head specially constructed tamper-resistant bolts to aluminum base which in turn shall be fastened to the wall by four concealed 1/4" mounting bolts.

The cover shall be equipped with an air inlet opening on the bottom side of the casting covered with an expanded metal grille having vanes with a minimum depth of 1/4" and a maximum spacing between vanes of 1/4". The cover shall also be equipped with an air outlet opening on the front side of the casting covered with a metal grille having vanes with a minimum depth of 5/8" and a spacing between vanes of 1/4".

All metal parts other than castings are to be plated with either cadmium (min. thickness .003") or with brightly polished chrome (min. copper .0003", min. nickel .0005", min. combined copper and nickel .001", min. chrome .0001").

The motor shall be of universal type, $1/10~\mathrm{HP}$, $7500~\mathrm{RPM}$ at rated load, with resilient mounting and sealed, lubricated ball bearings.

The motor shall be protected by a fuse.

A dynamically balanced fan shall be mounted directly on the motor shaft. The fan and motor unit shall be insulated from balance of dryer with rubber

resilient mounting, the rubber being stressed in shear to eliminate transmission of sound to the wall. The fan shall be a double inlet centrifugal type and shall deliver a minimum of 152 CFM at the discharge end of the nozzle.

The heating element shall be protected by an automatically resetting circuit breaker mounted directly on the heating element frame within the convolutions of the coil which shall open whenever the airflow is cut off and which shall close automatically as soon as the airflow is resumed.

The timer shall be designed to operate the hand dryer for a period of 30 seconds after actuation by the pushbutton.

The entire hand dryer shall be listed under re-examination service of Underwriter's Laboratories, Inc.

PART 3 EXECUTION - NOT USED

-- End of Section --